Feng Qian

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CONTACT

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EMPLOYMENT

08/2023 – Present: University of Southern California, Los Angeles CA
Associate Professor, Ming Hsieh Department of Electrical and Computer Engineering
Viterbi School of Engineering

08/2021 – 08/2023: University of Minnesota – Twin Cities, Minneapolis MN
Associate Professor, Department of Computer Science and Engineering
College of Science and Engineering

07/2022 – 08/2023: Amazon AWS, Seattle, WA
Senior Applied Research Scientist

08/2018 – 07/2021: University of Minnesota – Twin Cities, Minneapolis MN
Assistant Professor, Department of Computer Science and Engineering
College of Science and Engineering

01/2015 – 7/2018: Indiana University, Bloomington IN
Assistant Professor, Department of Computer Science
School of Informatics, Computing, and Engineering

09/2012 – 12/2014 : AT&T Labs – Research, Florham Park NJ & Bedminster NJ
Researcher (Senior Member of Technical Staff)

EDUCATION

09/2009 – 06/2012: University of Michigan, Ann Arbor MI
Ph.D. Degree, CSE Division, Department of EECS
Advisor: Professor Z. Morley Mao
Thesis: Characterization and Optimization of Resource Utilization for Cellular Networks
Distinguished Ph.D. Dissertation Award – Honorable Mention (Top 1.5%).

09/2007 – 05/2009: University of Michigan, Ann Arbor MI
M.S. Degree, CSE Division, Department of EECS
GPA: 8.5 / 9.0 (8.0 = A, 9.0 = A+)

09/2003 – 07/2007: Shanghai Jiao Tong University, Shanghai China
B.S. Degree, ACM Honors Class, Department of Computer Science
GPA: 89 / 100 (3.8 / 4.3), Major GPA: 91 / 100 (3.96 / 4.3), **Ranked at Top 1 out of 180.**
Thesis: Electroencephalography Based Vigilance Analysis
Best undergraduate thesis (3 out of 180).

HONORS AND AWARDS

2023 The Okawa Research Grant.

2022, 2023 AI 2000 Top-100 Scholar in Networking.

2021, 2023 Cisco Research Award.

2022 ACM MobiCom 2022 Best Community Paper.

2022 Google Research Scholar Award.

2021 Best Student Paper Award, ACM SIGCOMM 2021.

2019 CSAW 2019 Applied Research Winner (3rd Place).

2019 University of Minnesota DTI (Digital Technology Initiative) Award.

2019 DASH-IF Excellence Award

2018, 2019 IEEE InfoCom Distinguished TPC Award.

2018 Best Paper Award, ACM CoNEXT 2018.

2018 Indiana University Trustees Teaching Award.

2018 NSF Faculty Early Career Development Program (CAREER) Award.

2016 Google Faculty Award.

2016 Best Paper Award, ACM CoNEXT 2016.

2016 NSF CISE Research Initiation Initiative (CRII) Award.

2014 Key Contributor Award (KCA) at AT&T Labs – Research.

2013 Winner of the smartphone application challenge at GSMA's 18th annual Global Mobile Awards
ARO: Mobile Application Resource Optimizer (collaborated with U of M)

2011 First Place in Engineering Graduate Symposium Technical Session, University of Michigan
(Software and Intelligent Systems Session)
Project: "ARO: Mobile Application Resource Optimizer"

2011 Winners of the FCC Open Internet App Challenge
In the categories of "Open Internet App Award" and "People's Choice App".
Project: "MobiPerf: Mobile Network Measurement System"
University of Michigan and Microsoft Research

2010 First Place in 7th Annual Graduate Student Honors Competition of CSE Department

Best Paper Candidate: Mobisys 2012, PAM 2013, CoNEXT 2015

PUBLICATION OVERVIEW

Total Citations: 8,306 (5,324 since 2018)

H-Index: 46 (38 since 2018)

I10-Index: 97 (93 since 2018)

Google Scholar Page: `https://scholar.google.com/citations?user=-ExSBb0AAAAJ`

PUBLICATIONS

[NSDI24] **Habitus: Boosting Mobile Immersive Content Delivery through Full-body Pose Tracking and Multipath Networking** *Anlan Zhang, Chendong Wang, Yuming Hu, Ahmad Hassan, Zejun Zhang, Bo Han, Feng Qian, and Shichang Xu.* In USENIX NSDI 2024, Santa Clara, CA.

[NSDI24] **Passengers' Safety Matters: Experiences of Deploying a Large-Scale Indoor Delivery Monitoring System** *Xiubin Fan, Zhongming Lin, Yuming Hu, Tianrui Jiang, Feng Qian, Zhimeng Yin, S.-H. Gary Chan, and Dapeng Wu.* In USENIX NSDI 2024, Santa Clara, CA.

[CoNEXT23] **LEO Satellite vs. Cellular Networks: Exploring the Potential for Synergistic Integration** *Bin Hu, Xumiao Zhang, Qixin Zhang, Nitin Varyani, Z. Morley Mao, Feng Qian, and Zhi-Li Zhang.* In ACM CoNEXT 2023, Paris, France.

[MM23] **SkipStreaming: Pinpointing User-Perceived Redundancy in Correlated Web Video Streaming through the Lens of Scenes** *Wei Liu, Xinlei Yang, Zhenhua Li, and Feng Qian.* In ACM Multimedia 2023, Ottawa, Canada.

[MM23] ParliRobo: Participant Lightweight AI Robots for Massively Multiplayer Online Games (MMOGs)
Jianwei Zheng, Changnan Xiao, Mingliang Li, Zhenhua Li, Feng Qian, Wei Liu, and Xudong Wu. In ACM Multimedia 2023, Ottawa, Canada.

[ImmerCom23] MagicCloth: Protect User Privacy in AR Streaming *Yuming Hu, Mingyu Zhu, Qiao Jin, Feng Qian, and Bin Li.* In ACM ImmerCom 2023 Workshop (Co-located with MobiCom 2023), Madrid, Spain.

[MobiCom23] Virtual Device Farms for Mobile App Testing at Scale: A Pursuit for Fidelity, Efficiency, and Accessibility *Hao Lin, Jiaxing Qiu, Hongyi Wang, Zhenhua Li, Liangyi Gong, Di Gao, Yunhao Liu, Feng Qian, Zhao Zhang, Ping Yang, and Tianyin Xu.* In ACM MobiCom 2023, Madrid, Spain.

[MobiCom23] The Wisdom of 1,170 Teams: Lessons and Experiences from a Large Indoor Localization Competition *Yuming Hu, Xiubin Fan, Zhimeng Yin, Feng Qian, Zhe Ji, Yuanchao Shu, Yeqiang Han, Qiang Xu, Jie Liu, and Victor Bahl.* In ACM MobiCom 2023, Madrid, Spain.

[MobiCom23] Experience: A Three-Year Retrospective of Large-scale Multipath Transport Deployment for Mobile Applications *Chengke Wang, Hao Wang, Feng Qian, Kai Zheng, Chenglu Wang, Fangzhu Mao, Xingmin Guo, and Chenren Xu.* In ACM MobiCom 2023, Madrid, Spain.

[GetMobile23] Localize Yourself in Malls: An Anatomy of a Commercial Localization System with One-million Users
Yuming Hu, Feng Qian, Zhimeng Yin, Zhenhua Li, Zhe Ji, Yeqiang Han, Qiang Xu, Wei Jiang.
In ACM Mobile Computing and Communications (GetMobile), Volume 19, Issue 5, 2023. (Invited Article)

[WWW23] Visual-Aware Testing and Debugging for Web Performance Optimization
Xinlei Yang, Wei Liu, Hao Lin, Zhenhua Li, Feng Qian, Xianlong Wang, and Tianyin Xu.
In the Web Conference (WWW) 2023, Austin, Texas.

[CHI23] Collaborative Online Learning with VR Video: Roles of Collaborative Tools and Shared Video Control
Qiao Jin, Yu Liu, Ruixuan Sun, Chen Chen, Puqi Zhou, Bo Han, Feng Qian, and Svetlana Yarosh.
In ACM CHI 2023, Hamburg, Germany.

[ToN23] Fast Uplink Bandwidth Testing for Internet Users
Zhenhua Li, Xingyao Li, Xinlei Yang, Xianlong Wang, Feng Qian, and Yunhao Liu.
In IEEE/ACM Transactions on Networking, 2023.

[TMC23] Aging or Glitching? What Leads to Poor Android Responsiveness and What Can We Do About It?
Hao Lin, Cai Liu, Zhenhua Li, Feng Qian, Mingliang Li, Ping Xiong, Yunhao Liu.
In IEEE Transactions on Mobile Computing, 2023.

[TMC23] Robust Saliency-Driven Quality Adaptation for Mobile 360-Degree Video Streaming
Shibo Wang, Shusen Yang, Hairong Su, Cong Zhao, Chenren Xu, Feng Qian, Nanbin Wang, and Zongben Xu.
In IEEE Transactions on Mobile Computing, 2023.

[MobiCom23] The Wisdom of 1,100 Teams: Lessons and Experiences from a Large Indoor Localization Competition
Yuming Hu, Xiubin Fan, Zhimeng Yin, Feng Qian, Zhe Ji, Yuanchao Shu, Yeqiang Han, Qiang Xu, Jie Liu, and Victor Bahl.
Conditionally Accepted at ACM MobiCom 2023, Madrid, Spain.

[MobiCom23] Experience: Large-scale Multipath Deployment for Mobile Applications
Chengke Wang, Hao Wang, Fangzhu Mao, Kai Zheng, Xingmin Guo, Feng Qian, and Chenren Xu.
Conditionally Accepted at ACM MobiCom 2023, Madrid, Spain.

[PAM23] **An In-Depth Measurement Analysis of 5G mmWave PHY Latency and its Impact on End-to-End Delay**
Rostand Fezeu, Eman Ramadan, Wei Ye, Benjamin Minneci, Jack Xie, Arvind Narayanan, Ahmad Hassan, Feng Qian, Zhi-Li Zhang, Jaideep Chandrashekar, and Myungjin Lee.
In Passive and Active Measurement Conference (PAM) 2023, Virtual Conference.

[TRB23] **A Cooperative Perception Environment for Traffic Operations and Control**
Hanlin Chen, Brian Liu, Xumiao Zhang, Feng Qian, Z. Morley Mao, and Yiheng Feng.
In TRB (Transportation Research Board) 2023 Annual Meeting, Washington, DC.

[NSDI23] **POLYCORN: Data-driven Cross-layer Multipath Networking for High-speed Railway through Composable Schedulerlets**
Yunzhe Ni, Feng Qian, Taide Liu, Yihua Cheng, Zhiyao Ma, Jing Wang, Zhongfeng Wang, Gang Huang, Xuanzhe Liu, and Chenren Xu.
In USENIX NSDI 2023, Boston, MA.

[ICNP22] **To Punctuality and Beyond: Meeting Application Deadlines with DTP**
Jie Zhang, Hang Shi, Yong Cui, Feng Qian, Wei Wang, Kai Zheng, and Jianping Wu
In IEEE ICNP 2022, Lexington, Kentucky.

[SIGCOMM22] **Vivisecting Mobility Management in 5G Cellular Networks**
Ahmad Hassan, Shuowei Jin, Arvind Narayanan, Ruiyang Zhu, Anlan Zhang, Wei Ye, Jason Carpenter, Z. Morley Mao, Zhi-Li Zhang, and Feng Qian.
In ACM SIGCOMM 2022, Amsterdam, Netherlands.

[SIGCOMM22] **Mobile Access Bandwidth in Practice: Measurement, Analysis, and Implications**
Xinlei Yang, Hao Lin, Zhenhua Li, Feng Qian, Xingyao Li, Zhiming He, Xudong Wu, Xianlong Wang, Yunhao Liu, and Tianyin Xu. In ACM SIGCOMM 2022, Amsterdam, Netherlands.

[ICDCS22] **Enhancing Quality of Experience for Collaborative Virtual Reality with Commodity Mobile Devices**
Jiangong Chen, Feng Qian, and Bin Li.
In IEEE ICDCS 2022, Bologna, Italy.

[OSDI22] **Trinity: Desirable Mobile Emulation through Graphics Projection**
Di Gao, Hao Lin, Zhenhua Li, Chengen Huang, Liangyi Gong, Feng Qian, Yunhao Liu, and Tianyin Xu.
In USENIX OSDI 2022, Carlsbad, CA.

[CHI22] **How Will VR Enter University Classrooms? Multi-stakeholders Investigation of VR in Higher Education**
Qiao Jin, Yu Liu, Svetlana Yarosh, Bo Han, and Feng Qian.
In ACM CHI 2022, New Orleans, LA.

[HotMobile22] **Hybrid Mobile Vision for Emerging Applications**
Nan Wu, Felix Lin, Feng Qian, and Bo Han.
In ACM HotMobile 2022, Tempe, AZ.

[NSDI22] **YuZu: Super-resolution Enhanced Volumetric Video Streaming**
Anlan Zhang, Chendong Wang, Bo Han, and Feng Qian.
In USENIX NSDI 2022, Renton, WA.

[SigMetrics22] **Fusing Speed Index during Web Page Loading**
Wei Liu, Xinlei Yang, Hao Lin, Zhenhua Li, and Feng Qian.
In ACM SigMetrics 2022, Mumbai, India.

[InfoCom22] **A Comparative Measurement Study of Commercial 5G mmWave Deployments**
Arvind Narayanan, Muhammad Rochman, Ahmad Hassan, Bariq Firmansyah, Vanlin Sathya, Monisha Ghosh, Feng Qian, and Zhi-Li Zhang.
In IEEE INFOCOM 2022, Virtual Conference.

[MobiCom22] Vues: Practical Volumetric Video Streaming through Multiview Transcoding
Yu Liu, Bo Han, Feng Qian, Arvind Narayanan, and Zhi-Li Zhang.
In ACM MobiCom 2022, Sydney, Australia.

[MobiCom22] Experience: Practical Indoor Localization for Malls
Yuming Hu, Feng Qian, Zhimeng Yin, Zhenhua Li, Zhe Ji, Yeqiang Han, Qiang Xu, Wei Jiang.
In ACM MobiCom 2022, Sydney, Australia.

[MobiCom22] SalientVR: Saliency-Driven Mobile 360-Degree Video Streaming with Gaze Information
Shibo Wang, Shusen Yang, Hailiang Li, Xiaodan Zhang, Chen Zhou, Chenren Xu, Feng Qian, Nanbin Wang, Zongben Xu.
In ACM MobiCom 2022, Sydney, Australia.

[MobiCom21] EMP: Edge-assisted Multi-vehicle Perception
Xumiao Zhang, Anlan Zhang, Jiachen Sun, Xiao Zhu, Yihua Guo, Feng Qian, and Z. Morley Mao.
In ACM MobiCom 2021, New Orleans, LA.

[MobiCom21] A Nationwide Census on WiFi Security Threats: Prevalence, Riskiness, and the Economics Behind
Di Gao, Hao Lin, Zhenhua Li, Feng Qian, Qi Alfred Chen, Zhiyun Qian, Wei Liu, Liangyi Gong, Yunhao Liu, and Tianyin Xu.
In ACM MobiCom 2021, New Orleans, LA.

[IMC21] From Cloud to Edge: A First Look at Public Edge Platforms
Mengwei Xu, Zhe Fu, Xiao Ma, Li Zhang, Yanan Li, Feng Qian, Shangguang Wang, Ke Li, Jingyu Yang, Xuanzhe Liu.
In ACM Internet Measurement Conference (IMC) 2021, Virtual Conference.

[5G-MeMU21] Case for 5G-Aware Video Streaming Applications
Eman Ramadan, Arvind Narayanan, Udhaya Kumar Dayalan, Rostand A. K. Fezeu, Feng Qian, and Zhi-Li Zhang.
In ACM SIGCOMM 2021 Workshop on 5G Measurements, Modeling, and Use Cases (5G-MeMU), Virtual Conference.

[SIGCOMM21] A Variegated Look at 5G in the Wild: Performance, Power, and QoE Implications
Arvind Narayanan, Xumiao Zhang, Ruiyang Zhu, Ahmad Hassan, Shuowei Jin, Xiao Zhu, Dustin Zhang, Denis Rybkin, Michael Yang, Z. Morley Mao, Feng Qian, and Zhi-Li Zhang.
In ACM SIGCOMM 2021, Virtual Conference.

[SIGCOMM21] A Nationwide Study on Cellular Reliability: Measurement, Analysis, and Enhancements
Yang Li, Hao Lin, Zhenhua Li, Yunhao Liu, Feng Qian, Liangyi Gong, Xianlong Xin, and Tianyin Xu.
In ACM SIGCOMM 2021, Virtual Conference.
Best Student Paper Award

[WWW21] DeepVista: 16K Panoramic Cinema on Your Mobile Device
Wenxiao Zhang, Feng Qian, Bo Han, and Pan Hui.
In the Web Conference (WWW) 2021, Virtual Conference.

[HotMobile21] Efficient Point Cloud Streaming Through Super Resolution
Anlan Zhang, Chendong Wang, Bo Han, and Feng Qian.
In ACM HotMobile 2021, Virtual Conference.

[NSDI21] Fast and Light Bandwidth Testing for Internet Users
Xinlei Yang, Xianlong Wang, Zhenhua Li, Feng Qian, Liangyi Gong, Rui Miao, Yunhao Liu, and Tianyin Xu.
In USENIX NSDI 2021, Virtual Conference.

[NDSS21] Your Phone is My Proxy: Detecting and Understanding Mobile Proxy Networks

Xianghang Mi, Siyuan Tang, Zhengyi Li, Xiaojing Liao, Feng Qian, and XiaoFeng Wang.
In NDSS 2021, Virtual Conference.

[TDSC20] **DNS Poisoning of Operating System Caches:Attacks and Mitigations**
Fatemah Alharbi, Yuchen Zhou, Feng Qian, Zhiyun Qian, and Nael Abu-Ghazaleh.
In IEEE Transactions on Dependable and Secure Computing, 2020.

[IMC20] **Lumos5G: Mapping and Predicting Commercial mmWave 5G Throughput**
Arvind Narayanan, Eman Ramadan, Rishabh Mehta, Xinyue Hu, Qingxu Liu, Udhaya Kumar Dayalan, Rostand Fezeu, Saurabh Verma, Peiqi Ji, Tao Li, Feng Qian, and Zhi-Li Zhang.
In ACM Internet Measurement Conference (IMC) 2020, Virtual Conference.

[SIGCOMM20 (Poster)] **5G Tracker - A Crowdsourced Platform to Enable Research Using Commercial 5G Services**
Arvind Narayanan, Eman Ramadan, Jacob Quant, Peiqi Ji, Feng Qian, and Zhi-Li Zhang.
In ACM SIGCOMM 2020, Virtual Conference.

[MobiCom20] **ViVo: Visibility-aware Mobile Volumetric Video Streaming**
Bo Han, Yu Liu, and Feng Qian.
In ACM MobiCom 2020, Virtual Conference.

[MobiCom20] **Experience: Aging or Glitching? Why Does Android Stop Responding and What Can We Do About It?**
Mingliang Li, Hao Lin, Zhenhua Li, Feng Qian, Tianyin Xu, Cai Liu, and Yunhao Liu.
In ACM MobiCom 2020, Virtual Conference.

[ATC20] **Firefly: Untethered Multi-user VR for Commodity Mobile Devices**
Xing Liu, Christina Vlachou, Feng Qian, Chendong Wang, and Kyu-Han Kim.
In Proceedings of USENIX ATC 2020, Virtual Conference.

[MobiSys20] **MPBond: Efficient Network-level Collaboration Among Personal Mobile Devices**
Xiao Zhu, Jiachen Sun, Xumiao Zhang, Yihua Guo, Feng Qian, and Z. Morley Mao.
In Proceedings of ACM MobiSys 2020, Virtual Conference.

[SigMetrics20] **Latency Imbalance Among Internet Load-Balanced Paths: A Cloud-Centric View**
Yibo Pi, Sugih Jamin, Peter Danzig, and Feng Qian.
In Proceedings of ACM SigMetrics 2020, Virtual Conference.

[MMSys20] **Energy Considerations for ABR Video Streaming to Smartphones: Measurements, Models and Insights**
Chaoqun Yue, Subhabrata Sen, Bing Wang, Yanyuan Qin, and Feng Qian.
In Proceedings of ACM MMSys 2020, Virtual Conference.

[ToN20] **Understanding the Ecosystem and Addressing the Fundamental Concerns of Commercial MVNO**
Yang Li, Jianwei Zheng, Zhenhua Li, Yunhao Liu, Feng Qian, Sen Bai, Yao Liu, and Xianlong Xin.
In IEEE/ACM Transactions on Networking, 2020.

[EuroSys20] **Experiences of Landing Machine Learning onto Market-Scale Mobile Malware Detection**
Liangyi Gong, Zhenhua Li, Feng Qian, Zifan Zhang, Qi Alfred Chen, Zhiyun Qian, Hao Lin, and Yunhao Liu.
In Proceedings of ACM EuroSys 2020, Virtual Conference.

[WWW20] **A First Measurement Study of Commercial mmWave 5G Performance on Smartphones**
Arvind Narayanan, Eman Ramadan, Jason Carpenter, Qingxu Liu, Yu Liu, Feng Qian, and Zhi-Li Zhang.
In Proceedings of the Web Conference (WWW) 2020, Virtual Conference.

[FAST20] **Lock-Free Collaboration Support for Cloud Storage Services with Operation Inference and Transformation**
Jian Chen, Minghao Zhao, Zhenhua Li, Ennan Zhai, Feng Qian, Hongyi Chen, Yunhao Liu, and Tianyin

Xu.
In Proceedings of USENIX FAST 2020, Santa Clara, CA.

[CoNEXT19] Analyzing Viewport Prediction Under Different VR Interactions
Tan Xu, Bo Han, and Feng Qian.
In Proceedings of ACM CoNEXT 2019, Orlando, FL.

[ToN19] A Control Theoretic Approach to ABR Video Streaming: A Fresh Look at PID-based Rate Adaptation
Yanyuan Qin, Ruofan Jin, Shuai Hao, Krishna Pattipati, Feng Qian, Subhabrata Sen, Bing Wang, Chaoqun Yue.
In IEEE/ACM Transactions on Networking, 2019.

[APNet19] DTP: Deadline-aware Transport Protocol
Hang Shi, Yong Cui, Feng Qian, and Yuming Hu.
In Proceedings of ACM ACM APNet 2019, Beijing, China (co-located with ACM SIGCOMM).

[WearSys19] Understanding the Predictability of Smartwatch Usage
Yunsheng Yao, Xing Liu, and Feng Qian.
In Proceedings of ACM WearSys 2019, Seoul, South Korea.

[NOSSDAV19] Supporting Untethered Multi-user VR over Enterprise Wi-Fi
Xing Liu, Christina Vlachou, Feng Qian, and Kyu-Han Kim.
In Proceedings of ACM NOSSDAV 2019, Amherst, MA.

[MobiSys19] An In-depth Study of Commercial MVNO: Measurement and Optimization
Ao Xiao, Yang Li, Feng Qian, Zhenhua Li, Sen Bai, Yunhao Liu, Yao Liu, Xianlong Xin, and Tianyin Xu.
In Proceedings of ACM MobiSys 2019, Seoul, South Korea.

[TMC19] DeepWear: Adaptive Local Offloading for On-Wearable Deep Learning
Mengwei Xu, Feng Qian, Mengze Zhu, Feifan Huang, Saumay Pushp, and Xuanzhe Liu.
In IEEE Transactions on Mobile Computing, 2019.

[MMSys19] LIME: Understanding Commercial 360-degree Live Video Streaming Services
Xing Liu, Bo Han, Feng Qian, and Matteo Varvello.
In Proceedings of ACM MMSys 2019, Amherst, MA.
DASH-IF Excellence Award

[MMSys19] Quality-aware Strategies for Optimizing ABR Video Streaming QoE and Reducing Data Usage
Yanyuan Qin, Shuai Hao, Krishna Pattipati, Feng Qian, Subhabrata Sen, Bing Wang, and Chaoqun Yue.
In Proceedings of ACM MMSys 2019, Amherst, MA.

[SigMetrics19] Understanding the Networking Performance of Wear OS
Xiao Zhu, Yihua Guo, Ashkan Nikravesh, Feng Qian, and Z. Morley Mao.
In Proceedings of ACM SigMetrics 2019, Phoenix, AZ.

[HotMobile19] Toward Practical Volumetric Video Streaming on Commodity Smartphones
Feng Qian, Bo Han, Jarrell Pair, and Vijay Gopalakrishnan.
In Proceedings of ACM HotMobile 2019, Santa Cruz, CA. (Full Oral Presentation)

[INFOCOM19] Collaborative Client-Side DNS Cache Poisoning Attack
Fatemah Alharbi, Jie Chang, Yuchen Zhou, Feng Qian, Zhiyun Qian, and Nael Abu-Ghazaleh.
In Proceedings of IEEE INFOCOM 2019, Paris, France.

[MobiCom19] An Active-Passive Measurement Study of TCP Performance over LTE on High-speed Rails
Jing Wang, Yufan Zheng, Chenren Xu, Yunzhe Ni, Wangyang Li, Yihua Cheng, Zhuo Cheng, Feng Qian, Yuanjie Li, Xiufeng Xie, Yi Sun, and Zhongfeng Wang.
In Proceedings of ACM MobiCom 2019, Los Cabos, Mexico.

[MobiCom19] MP-H2: a Client-only Multipath Solution for HTTP/2
Ashkan Nikravesh, Yihua Guo, Xiao Zhu, Feng Qian, and Z. Morley Mao.
In Proceedings of ACM MobiCom 2019, Los Cabos, Mexico.

[UbiComp19] DeepType: On-Device Deep Learning for Input Personalization Service with Minimal Privacy Concerns
Mengwei Xu, Feng Qian, Qiaozhu Mei, and Xuanzhe Liu.
In ACM UbiComp 2019 / ACM IMWUT.

[S&P19] Dangerous Skills: Understanding and Mitigating Security Risks of Voice-Controlled Third-Party Functions on Virtual Personal Assistant Systems
Nan Zhang, Xianghang Mi, Xuan Feng, XiaoFeng Wang, Yuan Tian, and Feng Qian.
In Proceedings of IEEE Symposium on Security and Privacy 2019, San Francisco, CA.

[S&P19] Resident Evil: Understanding Residential IP Proxy as a Dark Service
Xianghang Mi, Xuan Feng, Xiaojing Liao, Baojun Liu, XiaoFeng Wang, Feng Qian, Zhou Li, Sumayah Alrwais, Limin Sun, and Ying Liu.
In Proceedings of IEEE Symposium on Security and Privacy 2019, San Francisco, CA.

[CoNEXT18] ABR Streaming of VBR-encoded Videos: Characterization, Challenges, and Solutions
Yanyuan Qin, Shuai Hao, Krishna Pattipati, Feng Qian, Subhabrata Sen, Bing Wang, Chaoqun Yue.
In Proceedings of ACM CoNEXT 2018, Heraklion/Crete, Greece.
Best Paper Award

[MobiCom18 Demo] Demo: Tile-Based Viewport-Adaptive Panoramic Video Streaming on Smartphones
Feng Qian, Bo Han, Qingyang Xiao, and Vijay Gopalakrishnan.
In Proceedings of ACM MobiCom 2018, New Delhi, India.

[MobiCom18] Flare: Practical Viewport-Adaptive 360-Degree Video Streaming for Mobile Devices
Feng Qian, Bo Han, Qingyang Xiao, and Vijay Gopalakrishnan.
In Proceedings of ACM MobiCom 2018, New Delhi, India.

[ToN18] DBABP: Robust Rate Adaptation Algorithm for SVC Video Streaming
Anis Elgabli, Vaneet Aggarwal, Shuai Hao, Feng Qian, and Subhabrata Sen.
In IEEE/ACM Transactions on Networking, 2018.

[HotMobile18] CARS: Collaborative Augmented Reality for Socialization
Wenxiao Zhang, Bo Han, Pan Hui, Vijay Gopalakrishnan, Eric Zavesky, and Feng Qian.
In Proceedings of ACM HotMobile 2018, Tempe, AZ.

[NDSS18] Game of Missuggestions: Semantic Analysis of Search-Autocomplete Manipulations
Peng Wang, Xianghang Mi, Xiaojing Liao, XiaoFeng Wang, Kan Yuan, Feng Qian, and Raheem Beyah.
In Proceedings of NDSS 2018, San Diego, CA.

[HotNets17] 360-Degree Innovations for Panoramic Video Streaming
Xing Liu, Qingyang Xiao, Vijay Gopalakrishnan, Bo Han, Feng Qian, and Matteo Varvello.
In Proceedings of ACM HotNets 2017, Palo Alto, CA.

[IMC17] An Empirical Characterization of IFTTT: Ecosystem, Usage, and Performance
Xianghang Mi, Feng Qian, Ying Zhang, and Xiaofeng Wang.
In Proceedings of ACM IMC 2017, London, UK.

[ICNP17] Selective HTTPS Traffic Manipulation at Middleboxes for BYOD Devices
Xing Liu, Feng Qian, and Zhiyun Qian.
In Proceedings of IEEE ICNP 2017, Toronto, Canada.

[MobiCom17 Demo] DEMS: DEcoupled Multipath Scheduler for Accelerating Multipath Transport
Yihua Guo, Ashkan Nikravesh, Z. Morley Mao, Feng Qian, and Subhabrata Sen.
In Proceedings of ACM MobiCom 2017 (Demo Session), Snowbird, UT.

[MobiCom17] Accelerating Multipath Transport Through Balanced Subflow Completion
Yihua Guo, Ashkan Nikravesh, Z. Morley Mao, Feng Qian, and Subhabrata Sen.
In Proceedings of ACM MobiCom 2017, Snowbird, UT.

[WearSys17] Rethink Phone-Wearable Collaboration From the Networking Perspective
Xing Liu, Yunsheng Yao, and Feng Qian.
In Proceedings of ACM WearSys 2017, Niagara Falls, NY.

[MobiSys17 Poster] Improve Push Notification on Smartwatches
Xing Liu, Yunsheng Yao, and Feng Qian.
In Proceedings of ACM MobiSys 2017 (Poster Session), Niagara Falls, NY.

[MobiSys17] Characterizing Smartwatch Usage in The Wild
Xing Liu, Tianyu Chen, Feng Qian, Zhixiu Guo, Felix Xiaozhu Lin, Xiaofeng Wang, and Kai Chen.
In Proceedings of ACM MobiSys 2017, Niagara Falls, NY.

[S&P 17] Under the Shadow of Sunshine: Understanding and Detecting BulletProof Hosting on Legitimate Service Provider Networks
Sumayah Alrwais, Xiaojing Liao, Xianghang Mi, Peng Wang, Xiaofeng Wang, Feng Qian, Raheem Beyah, and Damon McCoy.
In Proceedings of IEEE Symposium on Security and Privacy 2017, San Jose, CA.

[WWW17] Push or Request: An Investigation of HTTP/2 Server Push for Improving Mobile Web Performance
Sanae Rosen, Bo Han, Shuai Hao, Z. Morley Mao, and Feng Qian.
In Proceedings of WWW 2017, Perth, Australia.

[INFOCOM17] A Control Theoretic Approach to ABR Video Streaming: A Fresh Look at PID-based Rate Adaptation
Yanyuan Qin, Ruofan Jin, Krishna Pattipati, Feng Qian, Bing Wang, and Chaoqun Yue.
In Proceedings of IEEE INFOCOM 2017, Atlanta, GA.

[CoNEXT16] SMig: Stream Migration Extension For HTTP/2
Xianghang Mi, Feng Qian, and Xiaofeng Wang.
In Proceedings of ACM CoNEXT 2016, Irvine, CA.

[CoNEXT16] MPDASH: Adaptive Video Streaming Over Preference-Aware Multipath
Bo Han, Feng Qian, Lusheng Ji, and Vijay Gopalakrishnan.
In Proceedings of ACM CoNEXT 2016, Irvine, CA.
Best Paper Award

[IMC16] Understanding On-device Bufferbloat for Cellular Upload
Yihua Guo, Feng Qian, Qi Alfred Chen, Z. Morley Mao, and Subhabrata Sen.
In Proceedings of ACM IMC 2016, Santa Monica, CA.

[AllThingsCellular16] Optimizing 360 Video Delivery Over Cellular Networks
Feng Qian, Bo Han, Lusheng Ji, and Vijay Gopalakrishnan.
In Proceedings of All Things Cellular 2016 Workshop, New York, NY (co-located with MobiCom).

[AllThingsCellular16] When Should We Surf the Mobile Web Using Both WiFi and Cellular?
Bo Han, Feng Qian, and Lusheng Ji.
In Proceedings of All Things Cellular 2016 Workshop, New York, NY (co-located with MobiCom).

[MobiCom16 Poster] Measuring and Optimizing Android Smartwatch Energy Consumption
Xing Liu and Feng Qian.
In Proceedings of ACM MobiCom 2016 (Poster Session), New York, NY.
MobiCom Student Research Competition – 3rd Place

[MobiCom16] An In-depth Understanding of Multipath TCP on Mobile Devices: Measurement and

System Design
Ashkan Nikravesh, Yihua Guo, Feng Qian, Z. Morley Mao, and Subhabrata Sen.
In Proceedings of ACM MobiCom 2016, New York, NY.

[CoNEXT15] **TM^3: Flexible Transport-layer Multi-pipe Multiplexing Middlebox Without Head-of-line Blocking**
Feng Qian, Vijay Gopalakrishnan, Emir Halepovic, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM CoNEXT 2015, Heidelberg, Germany.

[CoNEXT15] **An Anatomy of Mobile Web Performance over Multipath TCP**
Bo Han, Feng Qian, Shuai Hao, and Lusheng Ji.
In Proceedings of ACM CoNEXT 2015, Heidelberg, Germany.
Best Paper Candidate

[IEEE Int. Comp.] **Toward Mobile-friendly Web Browsing (Invited Article)**
Feng Qian.
In IEEE Internet Computing, Volume 19, Issue 5, 2015.

[IMC15] **Revisiting Network Energy Efficiency of Mobile Apps: Performance in the Wild**
Sanae Rosen, Ashkan Nikravesh, Yihua Guo, Z. Morley Mao, Feng Qian, and Subhabrata Sen.
In Proceedings of ACM Internet Measurement Conference (IMC) 2015, Tokyo, Japan.

[AllThingsCellular15] **MetaPush: Cellular-Friendly Server Push For HTTP/2**
Bo Han, Shuai Hao, and Feng Qian (Equal Contribution)
In Proceedings of All Things Cellular 2015, London, UK (co-located with SIGCOMM).

[ANCS15] **High-Speed and Memory-Efficient Forwarding Engine for Future Internet Architecture**
Mehrdad Moradi, Feng Qian, Qiang Xu, Z. Morley Mao, Darrell Bethea, and Michael Reiter
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Bo Han, Feng Qian, and Moo-Ryong Ra. (Equal Contribution)
In Proceedings of ACM HotMobile 2015, Santa Fe, NM.

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In Proceedings of ACM Mobisys 2014, Bretton Woods, NH.

[PAM14] **RadioProphet: Intelligent Radio Resource Deallocation for Cellular Networks**
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In Proceedings of Passive and Active Measurement Conference (PAM) 2014, Los Angeles, CA.

[CoNEXT13] **Silent TCP Connection Closure for Cellular Networks**
Feng Qian, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM CoNEXT 2013, Santa Barbara, CA.

[SIGCOMM13] **An In-depth Study of LTE: Effect of Network Protocol and Application Behavior on Performance**
Junxian Huang, Feng Qian, Yihua Guo, Yuanyuan Zhou, Qiang Xu, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM SIGCOMM 2013, Hong Kong, China.

[PAM13] **How to Reduce Smartphone Traffic Volume by 30%?**
Feng Qian, Junxian Huang, Jeffrey Erman, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of Passive and Active Measurement Conference (PAM) 2013, Hong Kong, China.
Best Paper Candidate

[IMC12] **Screen-Off Traffic Characterization and Optimization in 3G/4G Networks**
Junxian Huang, Feng Qian, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.

In Proceedings of ACM Internet Measurement Conference (IMC) 2012, Boston, Massachusetts.

[Ph.D. Thesis] **Characterization and Optimization of Resource Utilization For Cellular Networks**
Feng Qian. Ph.D. thesis, University of Michigan, May 2012.
Distinguished Ph.D. Dissertation Award - Honorable Mention

[MobiSys12] **Web Caching on Smartphones: Ideal vs. Reality**
Feng Qian, Kee Shen Quah, Junxian Huang, Jeffrey Erman, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM Mobisys 2012, Low Wood Bay, Lake District, United Kingdom.
Best Paper Candidate

[MobiSys12] **A Close Examination of Performance and Power Characteristics of 4G LTE Networks**
Junxian Huang, Feng Qian, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM Mobisys 2012, Low Wood Bay, Lake District, United Kingdom.

[WWW12] **Periodic Transfers in Mobile Applications: Network-wide Origin, Impact, and Optimization**
Feng Qian, Zhaoguang Wang, Yudong Gao, Junxian Huang, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of WWW 2012, Lyon France.

[MobiSys11] **Profiling Resource Usage for Mobile Applications: a Cross-layer Approach**
Feng Qian, Zhaoguang Wang, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM Mobisys 2011, Washington, DC.

[MobiSys11 Demo] **Demo: Mobile Application Resource Optimizer (ARO) (System Demo)**
Feng Qian, Zhaoguang Wang, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of ACM Mobisys 2011 (Demo Session), Washington, DC.

[SIGMETRICS11] **Cellular Data Network Infrastructure Characterization and Implication on Mobile Content Placement**
Qiang Xu, Junxian Huang, Zhaoguang Wang, Feng Qian, Alexandre Gerber, and Z. Morley Mao.
In Proceedings of ACM SIGMETRICS 2011, San Jose, CA.

[ICNP10] **TOP: Tail Optimization Protocol for Cellular Radio Resource Allocation**
Feng Qian, Zhaoguang Wang, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
In Proceedings of IEEE ICNP 2010, Kyoto Japan.

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Feng Qian, Zhaoguang Wang, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, and Oliver Spatscheck.
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[IMC09] **TCP Revisited: A Fresh Look at TCP in the Wild**
Feng Qian, Alexandre Gerber, Z. Morley Mao, Subhabrata Sen, Oliver Spatscheck, and Walter Willinger.
In Proceedings of ACM Internet Measurement Conference (IMC) 2009, Chicago, IL.

[SIGMETRICS10] **A Case for Unsupervised-Learning-based Spam Filtering (Extended Abstract)**
Feng Qian, Abhinav Pathak, Y. Charlie Hu, Z. Morley Mao, and Yinglian Xie.
In Proceedings of SIGMETRICS 2010, New York City, NY.

[SecureComm09] **Ensemble: Community-based Anomaly Detection for Popular Applications**
Feng Qian, Zhiyun Qian, Z. Morley Mao, and Atul Prakash.
In Proceedings of SecureComm 2009, Athens Greece. (Poster in USENIX Security 2008.)

[SIGMETRICS09] **Botnet Spam Campaigns can be Long Lasting: Evidence, Implications, and Analysis**
Abhinav Pathak, Feng Qian, Y. Charlie Hu, Z. Morley Mao, and Supranamaya Ranjan.
In Proceedings of SIGMETRICS 2009, Seattle WA.

[Textbook] **Algorithms (Commented version in Chinese). ISBN 9787111253617**

Feng Qian and Hengming Zou. Published by China Machine Press, 2009.

INTERNSHIP EXPERIENCE

Intern at AT&T Labs Research, Florham Park NJ (Summer 2008, 2009, 2010, and 2011)
Related work: Network measurement, traffic analysis, and mobile systems.

Intern at Software Solution Group, Intel Corporation, Shanghai China (Summer 2006)

TEACHING EXPERIENCE

Spring 2022: CSCI 4211 Introduction to Computer Networks.
Fall 2021: CSCI 8980 Topics in Mobile Computing.
Fall 2021: CSCI 2011 Discrete Structures of Computer Science.
Fall 2020: CSCI 4211 Introduction to Computer Networks.
Spring 2020: CSCI 2011 Discrete Structures of Computer Science.
Fall 2019: CSCI 8970 Computer Science Colloquium.
Fall 2019: CSCI 4211 Introduction to Computer Networks.
Spring 2019: CSCI 8980 Topics in Mobile Computing.
Spring 2018: CSCI-B 649 Mobile Computing.
Fall 2017: CSCI-P 438 Introduction to Computer Networks.
Spring 2017: CSCI-B 649 Mobile Computing.
Fall 2016: CSCI-P 538 Computer Networks.
Fall 2016: CSCI-P 438 Introduction to Computer Networks.
Fall 2015: CSCI-P 438 Introduction to Computer Networks.
Spring 2015: CSCI-B 649 Mobile Computing.
Fall 2009: EECS 203 Discrete Math, University of Michigan (as a graduate student instructor).
Fall 2006: CS 371 Course Project of Operating System, SJTU (as a teaching assistant).

MENTORED STUDENTS

Bin Hu (Graduate Student, UMN, since 2022)
Ahmad Hassan (Graduate Student, UMN, since 2020)
Zejun Zhang (Graduate Student, UMN, since 2020)
Yuming Hu (Graduate Student, UMN, since 2020)
Anlan Zhang (Graduate Student, UMN, since 2019)
Yu Liu (Graduate Student, UMN, since 2019)
Arvind Narayanan (Ph.D. Student, UMN, since 2019, co-advised with Prof. Zhi-Li Zhang)
Xing Liu (Ph.D. Student, IUB/UMN, 2015–2020)
Xianghang Mi (Ph.D. Student, IUB, 2015–2020, co-advised with Prof. Xiaofeng Wang)
Runsheng Ma (Undergraduate Student, UMN, 2019)
Hang Shi (Visiting Scholar, UMN, 2019–2020)
Wangyang Li (Visiting Scholar, UMN, 2019)
Wenxiao Zhang (Visiting Scholar, IUB, 2018)
Justus Schriedel (Undergraduate Student, IUB, 2017–2018)
Yunsheng Yao (Graduate Student, IUB, 2017)
Qingyang Xiao (Graduate Student, IUB, 2016–2018)
Tianyu Chen (Graduate Student, IUB, 2016–2017)
Yihua Guo (Summer Intern at AT&T Labs – Research, 2014)
Yuanyuan Zhou (Summer Intern at AT&T Labs – Research, 2013)

PROFESSIONAL SERVICES

Journal and Conference Reviewer: IEEE Transactions on Mobile Computing (TMC), IEEE/ACM Transactions on Networking (TNET), SIGCOMM Computer Communication Review (CCR), IEEE Transactions on Parallel and Distributed Systems (TPDS), IEEE Transactions on Dependable and Secure Computing (TDSC), ACM Transactions on Embedded Computing (TECS), IEEE Transactions on Cloud Computing (TCC), IEEE Transactions on Wireless Communications (TWC), IEEE Transactions on Multimedia (MM), IEEE Transactions on Vehicular Technology (TVT), IEEE Transactions

on Emerging Topics in Computing, IEEE Communications Letters (CL), IEEE Internet Computing Magazine, IEEE Pervasive Computing, IEEE Computer Architecture Letters, IEEE Journal on Selected Areas in Communications (JSAC), IEEE Transactions on Services Computing (TSC), IEEE Access, ACM Transactions on Internet Technology (TOIT), Elsevier Pervasive and Mobile Computing (PMC), Elsevier COMNET, Elsevier COMCOM, Elsevier ADHOC, Springer Computing, John Wiley & Sons IJCS, Wiley ETT, Elsevier Journal of Systems Architecture (JSA), Security and Communication Networks (SCN), Science China Information Sciences (SCIS), ACM UbiComp, EuroSys, IEEE Infocom, IEEE ICC, IEEE COMSNETS.

Conference and Workshop Program Committee: IEEE InfoCom 2024, ImmerCom 2023 (Program Co-chair), ACM SIGCOMM 2023 (Travel Grant Chair), ACM Multimedia 2023, IEEE ICNP 2023 (Workshop Co-chair), IEEE ICNP 2023, ACM APSys 2023, ACM CoNEXT 2023, The Web Conf (WWW) 2023, IEEE InfoCom 2023, IEEE LANMAN 2022, ACM ICNP 2022, ACM ICNP 2022 (Sponsorship Chair), ACM Multimedia 2022, ACM MMSys 2022, ACM HotMobile 2022, ACM MobiCom 2022, IEEE InfoCom 2022, IEEE ICNP 2021, ACM MMSys 2021 (Program Co-chair), ACM MobiCom 2021, IEEE InfoCom 2021, ACM MM 2020 (OSC Track), ACM SIGCOMM 2020 Workshop on Networking for Emerging Applications and Technologies (NEAT 2020), ACM NOSSDAV 2020, IEEE ICNP 2020, IEEE ICDCS 2020, ACM MobiSys 2020, ACM SOSR 2020, IEEE InfoCom 2020, ACM MobiCom 2019 Workshop on Mobile Augmented and Virtual Reality System for Immersive Experiences (MAVRIX 2019) Program Co-chair, ACM CoNEXT 2019, IEEE ICNP 2019, ACM SIGCOMM 2019 Poster/Demo Session, IEEE ICNP 2019 Finance Co-chair, IEEE/ACM IWQoS 2019, ACM SIGCOMM 2019 Workshop on Networking for Emerging Applications and Technologies (NEAT 2019), ACM CCS 2019, ACM SOSR 2019 Travel Grant Chair, ACM SOSR 2019 Poster/Demo Session, IEEE InfoCom 2019, IEEE ICNP 2018, ACM SIGCOMM 2018 Workshop on VR/AR, WWW 2018, IEEE InfoCom 2018, ACM MobiCom 2017 (travel grant co-chair), IEEE ICNP 2017, IEEE Performance and Fault Management in Cellular Networks (collocated with Infocom 2017), IEEE SECON 2017, IEEE ICDCS 2017, The 2017 Workshop on Data Analytics for Mobile Networking, IEEE Infocom 2017, IEEE ICNP 2016, ICCCN 2016, BIGCOM 2016, IEEE PIMRC 2016, ACM MobiCom 2016 (light), ACMC AisaCCS 2016, IEEE Infocom 2016, IoT-App 2015, HotPower 2015, SecureComm 2015, IEEE PIMRC 2015, IEEE SECON 2015, ACM Mobisys 2014, All Things Cellular 2014 (collocated with ACM SIGCOMM 2014), ACM SIGCOMM 2014 Poster & Demo, IEEE PIMRC 2014.

PATENTS

Adaptive Video Streaming Over Preference-Aware Multipath.
US-20180167436-A1, US-10348796-B2

Bundling Data Transfers And Employing Tail Optimization Protocol To Manage Cellular Radio Resource Utilization.
US-20120324041-A1, US-20150327057-A1, US-9220066-B2, US-9699737-B2, US-20170290043-A1, US-10306665-B2, US-20190254048-A1, US-10638499-B2

Controlling Traffic Transmissions To Manage Cellular Radio Resource Utilization.
US-20130035082-A1, US-9264872-B2, US-20160127877-A1, US-9654950-B2, US-20170238322-A1, US-10064195-B2, US-20180279314-A1, US-10165576-B2

Detecting Irregular Retransmissions.
US-20110103256-A1, US-8817653-B2

Energy Savings On Multihomed Mobile Devices Using A Dynamically Adjusted Inactivity Timer.
US-20170019857-A1, US-11419054-B2

Facilitation Of Efficient Web Site Page Loading.
US-20170034302-A1, US-10084884-B2, US-20180375962-A1, US-11356533-B2

Facilitation Of Mobile Device Resource Optimization.
US-20160165584-A1, US-10172041-B2

Facilitation Of Multipath Scheduling.

US-20170290036-A1, US-9992786-B2, US-20180255560-A1

Facilitation Of Multipath Transmission Control Protocols.
US-20170302549-A1, US-10193781-B2, US-20190158568-A1, US-10594766-B2

Inferring Tcp Initial Congestion Window.
US-20110096662-A1, US-8274886-B2, US-20120307678-A1, US-8750109-B2

Intelligent Mobility Application Profiling Tool.
US-20120151041-A1, US-20130315088-A1, US-8972572-B2, US-20150131471-A1, US-9578441-B2

Intelligent Mobility Application Profiling With Respect To Identified Communication Bursts.
US-8527627-B2

Location-Awareness-Based Network Intermediate Device.
US-20230131149-A1

Method And Apparatus For Characterizing Infrastructure Of A Cellular Network.
US-20120155319-A1, US-8948048-B2

Method And Apparatus For Closing A Transmission Control Protocol Connection For A Wireless Communications Network.
US-20150156812-A1, US-9565716-B2, US-20170150551-A1, US-10212756-B2, US-20190182891-A1, US-10805981-B2

Method And Apparatus For Decryption Of Encrypted Ssl Data From Packet Traces.
US-20160142440-A1, US-10375112-B2, US-20190356695-A1, US-11240269-B2, US-20220109695-A1

Method And Apparatus For Inferring State Transitions In A Wireless Communications Network.
US-20120120812-A1, US-8570926-B2

Method And Apparatus For Normalizing Cellular Communications Network Data.
US-20120057571-A1, US-8948043-B2

Method And Apparatus For Performing A Demotion In A Cellular Communications Network.
US-20120058773-A1, US-8606290-B2

Method And Apparatus For Providing A Dynamic Inactivity Timer In A Wireless Communications Network.
US-20120122405-A1, US-8611825-B2

Method And Apparatus For Web Browsing On Multihomed Mobile Devices.
US-20170181211-A1, US-10405365-B2, US-20190387565-A1, US-11206706-B2

Method And System For Scalable Video Streaming.
US-20200068209-A1, US-10674166-B2

Method Of Dynamic Adaptive Streaming For 360-Degree Videos.
US-20190281318-A1, US-10659815-B2

Method, Systems And Devices For Providing Adjusted Video Content According To Viewing Distance.
US-20210235140-A1, US-11190817-B2, US-20220060769-A1, US-11641498-B2

Methods And Devices For Adapting The Rate Of Video Content Streaming.
US-20190379875-A1, US-10812774-B2

Methods And Devices For Determining Multipath Routing For Panoramic Video Content.
US-20200007905-A1, US-10616621-B2

Methods, Devices, And Computer Program Products For Providing A Computing Application Rating.
US-20130007255-A1, US-9003017-B2, US-20150212563-A1, US-9477283-B2

Methods, Devices, And Systems For Decoding Portions Of Video Content According To A Schedule Based On User Viewpoint.
US-20200128279-A1, US-10931979-B2

Methods, Systems And Devices For Adjusting Panoramic Video Content.
US-20200053280-A1, US-10708494-B2

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Selective Streaming Of Immersive Video Based On Field-Of-View Prediction.
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Tile Scheduler For Viewport-Adaptive Panoramic Video Streaming.
US-20200128280-A1, US-10779014-B2

Transferring Data Over Multiple Network Paths Using Decoupled Sub-Flows.
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Using User-Side Contextual Factors To Predict Cellular Radio Throughput.
US-20230068437-A1