COMPUTER SCIENCE & ENGINEERING
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DISSERTATION DEFENSE

XIAO ZHU

Improving Mobile Internet Performance with Cross-Device Network Transport and Cross-Layer Application Adaptation

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ABSTRACT: The mobile Internet is becoming increasingly complex with a wide diversity of end systems (including wearables and automobiles), the co-presence of multiple devices with collaboration potential, and the growth of user-generated application traffic fueled by improved mobile sensors and wireless access. As the Internet evolves along with these trends, the increased complexity of different components and protocol layers makes it more challenging to achieve high network utilization and meet the diverse QoE requirements for mobile applications. As a result, despite the richness of various network resources, the performance of today's mobile applications still falls behind expectations. To address this challenge, in this dissertation, I demonstrate that with a better understanding of the various components and different protocol layers of the increasingly complex mobile Internet, we can identify unique performance problems and leverage such knowledge to develop network transport protocols with cross-device awareness and application adaptation strategies with cross-layer considerations for better mobile app performance. My dissertation consists of four parts to support this statement: (1) characterizing and improving wearable network transport management, (2) designing distributed multipath transport for multiple mobile devices, (3) characterizing and improving mobile live video upload rate adaptation, and (4) designing collaborative sensing architecture for vehicular applications.

CHAIR: Prof. Z. Morley Mao