



Graduate Seminar (EEL 6936)
Department of Electrical Engineering
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Stateful Inter-Packet Signal Processing for Wireless Networking

Abstract

Traditional signal processing design (e.g., frequency offset and channel estimation) at a receiver treats each packet arrival as an independent process to facilitate decoding and interpreting packet data. In this talk, we enhance the performance of this process in the wireless network domain. We propose STAteful inter-Packet signal procEssing (STAPLE), a framework of stateful signal processing residing between the physical and link layers. STAPLE transforms the signal processing procedure into a lightweight stateful process that caches in a small-sized memory table physical and link layer header fields as packet state information. The similarity of such information among packets serves as prior knowledge to further enhance the reliability of signal processing and thus improve the wireless network performance. We implement STAPLE on USRP X300-series devices with adapted configurations for 802.11a/b/g/n/ac and 802.15.4. The STAPLE prototype is of low processing complexity and does not change any wireless standard specification. Comprehensive experimental results show that the benefit from STAPLE is universal in various wireless networks.

Biography



Shangqing Zhao is currently a third year Ph.D. student under Prof. Zhuo Lu's supervision in the Communications, Security and Analytics (CSA) Lab of the Department of Electrical Engineering at the University of South Florida. He received the B.S. degree from the Fujian Agriculture and Forestry University in 2010 and M.S. degree from Henan Polytechnic University in 2015. His current research interests include wireless networking and security. He is a Student Member of ACM and IEEE.