



Illinois Center for Wireless Systems

ICWS Seminar Series



ROLE OF FEEDBACK IN NETWORKS

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Abstract: Traditionally, it is believed that feedback has had little impact on increasing capacity. This is mainly due to Shannon's original result on feedback capacity, where he showed that feedback cannot increase the capacity in point-to-point communication links. Hence the use of feedback has been so far limited to improving the reliability of communication, usually in the form of ARQ.

In this talk, I will present a promising role of feedback in networks. What we have shown is that when there are two interfering point-to-point links, not only can feedback increase capacity of each link, but it can in fact provide an unbounded increase in capacity as the signal-to-noise ratio of the links increases. In the process of deriving this conclusion, we characterize the feedback capacity of the two-user Gaussian interference channel to within 2 bits/s/Hz.

Furthermore, I will show the gain of using feedback even when feedback cost is taken into consideration. Specifically, we demonstrate that one bit of feedback can provide a capacity increase of more than one bit, possibly an arbitrary large number of bits. Finally, I will make a connection between our feedback problem and many other problems in communications. We believe that a deep understanding of this connection will provide significant ramifications on a wide variety of network research.

Biography: Changho Suh received the Ph.D. degree in Electrical Engineering and Computer Sciences from UC-Berkeley in 2011, under the supervision of Prof. David Tse. He received the B.S. and M.S. degrees in Electrical Engineering from Korea Advanced Institute of Science and Technology in 2000 and 2002 respectively. Before joining Berkeley, he had been with the Telecommunication R&D Center, Samsung Electronics.

He received the [David J. Sakrison Memorial Prize](#) for outstanding doctoral research from the UC-Berkeley EECS Department in 2011, the [Best Student Paper Award of the IEEE International Symposium on Information Theory](#) in 2009 and the [Outstanding Graduate Student Instructor Award](#) in 2010. He was awarded several fellowships, including the Vodafone U.S. Foundation Fellowship in 2006 and 2007; the Kwanjeong Educational Foundation Fellowship in 2009; and the Korea Government Fellowship from 1996 to 2002.

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