Industrial Perspective on Perception of Physical Layer Stagnation and New Research Avenues

Stephan ten Brink

Shannon's fundamental insights into the nature of information of the late 1940's -- as well as the success of semiconductor technology during the subsequent decades -- paved the way toward highly integrated application specific circuits (ASICs) that, by now, have delivered most of their initial promise:

Sophisticated, yet cost efficient signal processing techniques, enabling reliable bit transmission over several communication media, be it cable, optical fiber, or wireless, leading to such engineering miracles like smartphones and media tablets, all interconnected through a world-wide communication network.

These first 50 "golden" years of information processing and transmission were mostly dominated by physical layer innovations, and in the olympic spirit of "Faster, Higher, Stronger", there are still plenty of new things out there to discover.

While striving for technical excellence appears to be a worthwhile and noble goal for academia for the next 50 years to come, the industrial players need to justify costs to the shareholder according to economical considerations, and the willingness of the telecommunications industry at large for taking sizeable upfront research investments is declining. This talk discusses physical layer trends in light of user needs, a growing application space, industrial productization, and the theoretical possible of academic research.