Seminar series of
Enabling Advances in Technology (EAT) @ DIET

Seminar Announcement

June 18th, 2015 - DIET Dept. Room 206, 1:15 p.m.

Joint optimization of radio and computational resources in mobile cloud computing

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Abstract: Mobile terminals, such as smartphones, tablets and netbooks, are increasingly penetrating into our everyday lives as the most convenient tools for communication, entertainment, business, social networking, etc. However, some of the major impediments to run sophisticated applications on mobile handsets are represented by their limited battery lifetime and the scarcity of their computational capability. A possible strategy to overcome this energy/computation bottleneck consists in enabling resource-constrained mobile devices to offload their most energy-consuming tasks to nearby more resourceful servers which can be conceived as small cell LTE base stations endowed with, albeit limited, cloud functionalities. Hence, in this framework, we consider a multicell system wherein several Mobile Users (MUs) ask for computation offloading to a common cloud server through their femto-access points. We formulate the computation offloading problem as a joint optimization of the radio and computational resources in order to minimize the overall   users' energy consumption while meeting the latency constraints imposed by the applications running on the MUs. Then, to solve the resulting nonconvex problem, we devise an iterative algorithm converging to local optimal solutions of the original nonconvex problem based on recent successive convex approximation (SCA) techniques. Additionally, a more general context is considered, composed of multiple cells and multiple cloud providers concurring to serve multiple users. Our objective becomes to find the optimal assignment of each mobile user to a cloud server through the most convenient base station and, contextually, the radio and computational resources assignment under latency constraints.Finally, assuming an alternative offloading strategy based on code partitioning, it will be illustrated an approach that optimizes code partitioning and radio resource allocation jointly in order to minimize the energy consumption at the mobile side under power budget and latency constraints.

Bio: Stefania Sardellitti (M'12) received the   Dr. Eng. degree in Electronic Engineering from the University of Rome ``La Sapienza'', Italy, in 1998 and   the Ph.D. degree in Electrical and Information Engineering from the University of Cassino, Italy, in 2005. Since 2005 she is an appointed professor of digital communications at the University of Cassino, Italy. She is currently a research assistant at the Department of Information, Electronics and Telecommunications, University of Rome, Sapienza, Italy. She has participated in the European project WINSOC, on wireless sensor networks and in the European project FREEDOM on femtocell networks. She is currently involved in the European TROPIC, on distributed computing, storage and radio resource allocation over cooperative femtocells. Her research interests are in the area of statistical signal processing, in particular on multiple antenna and multiple access systems. Currently, her primary research activity is on the field of mobile cloud comuting over heterogeneous networks, cognitive radios, small-cell networks and wireless sensor networks, with emphasis on distributed decision.