The Ultimate Frontier for Privacy and Security: Medicine

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Abstract:
Personalized medicine brings the promise of better diagnoses, better treatments, a higher quality of life and increased longevity. To achieve these noble goals, it exploits a number of revolutionary technologies, including genome sequencing and DNA editing, as well as wearable devices and implantable or even edible biosensors. In parallel, the popularity of "quantified self" gadgets shows the willingness of citizens to be more proactive with respect to their own health. Yet, this evolution opens the door to all kinds of abuses, notably in terms of discrimination, blackmailing, stalking, and subversion of devices.

After giving a general description of this situation, in this talk we will expound on some of the main concerns, including the temptation to permanently and remotely monitor the physical (and metabolic) activity of individuals. We will describe the potential and the limitations of techniques such as cryptography (including secure multi-party computation), trusted hardware and differential privacy. We will also discuss the notion of consent in the face of the intrinsic correlations of human data. We will argue in favor of a more systematic, principled and cross-disciplinary research effort in this field and will discuss the motives of the various stakeholders.

Bio:

Jean-Pierre Hubaux is a full professor at the School of Information and Communication Sciences of EPFL. Through his research, he contributes to laying the foundations and developing the tools to protect privacy in tomorrow's hyper-connected world. He is focusing notably on network privacy and security, with an emphasis on mobile/wireless networks and on data protection, with an emphasis on health-related data and especially genomic data. He co-founded ACM WiSec in 2008 and chaired its steering committee during the first four years. Since 2007, he has been one of the seven commissioners of the Swiss FCC. He was recently appointed to the "Information Security Task Force", set up by the Swiss federal government. He has worked on the topic of genome privacy since 2011 and has designed related cryptographic solutions, in close collaboration with geneticists. He co-chaired the first workshop devoted to the topic (in Dagstuhl, Germany, in 2013). He is also a member of the "Genomics" task force set up by the Cantonal Ministry of Health. He is a Fellow of both IEEE (2008) and ACM (2010).

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