The Economics of Cyber Crime

by

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Abstract:
Digital technologies are creating more value and thus getting more attractive to cyber criminals. The widespread adoption of cryptocurrencies also provides the privacy such that cyber criminals can be paid without being traced. It is therefore expected that the criminals with economic incentives will try to hack digital systems and ask for ransom to not disturb the compromised ones. The current example is ransomware attacks that attempt to encrypt victims’ files. We model the interactions between the attackers and defenders in such attacks with a dynamic Bayesian game. Specifically, we model the defenders’ decisions on how to defend and whether to pay the ransom when being successfully attacked and the attackers’ decisions on whether to attack and whether to leave the compromised systems unimpaired after being paid. Throughout the dynamics there are two processes. The first is the attackers' learning about the distribution of the defenders' level of defense, and the second is the attackers' reputation building on being honest after being paid. The defenders' behavior exerts externalities through both processes. We therefore explore policies that could enhance social welfare through moderating these externalities in the game. Specifically, we explore policies that compensate for the cost of defending or regulate the communication among the defenders.

Bio:
Xiaofan Li is a PhD candidate in the area of information systems at UT Austin. His research interest includes cybersecurity, cryptocurrency and data analytics, with a focus on the economic view of cybersecurity and cryptocurrency problems. He is currently a Ripple Graduate Fellow.