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Decision and Game Theory for Security

Second International Conference, GameSec 2011
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Proceedings



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Preface

Securing complex and networked systems has become increasingly important as these systems play an indispensable role in all aspects of modern life. Security, trust, authentication, and privacy of communications, data, and computing are critical for many applications and infrastructures, and their analysis and establishment pose novel and difficult challenges. These challenges are further exacerbated by the heterogeneity of communication networks, and by their distributed and asynchronous operation. Human, social, and economic factors play an important role in security and performance of such networked systems, and pose additional challenges that require innovative methodologies and at the same time challenge the foundations of conventional methods in computer science, mathematics, economics, and sociology. The investigation of security, trust, and privacy in such systems involves inference and decision making at multiple levels and time scales, given the limited and time-varying resources available to both malicious attackers and administrators defending these complex networked systems. Decision and game theory — in a broad sense — provides a rich and increasingly expanding arsenal of methods, approaches, and algorithms with which to address the novel resource allocation, inference, and decision-making problems arising in security, trust, and privacy of networked systems.

GameSec 2011, the Second Conference on Decision and Game Theory for Security, took place on the campus of the University of Maryland, College Park, during November 14–15, 2011, under the sponsorships of the Maryland Cybersecurity Center (MC²) and other technical sponsors. GameSec brings together researchers who aim to establish a theoretical foundation for making resource-allocation decisions that balance available capabilities and perceived security risks in a principled manner. The conference focuses on analytical models based on game, information, communication, optimization, decision, and control theories that are applied to diverse security topics. At the same time, the connections between theoretical models and real-world security problems are emphasized to establish the important feedback loop between theory and practice. Given the scarcity of venues for researchers who try to develop a deeper theoretical understanding of the underlying incentive and resource allocation issues in security, GameSec aims to fill an important void and to serve as a distinguished forum.

This edited volume contains the summaries of the two plenary keynote addresses, and the 16 contributed full papers, presented at GameSec 2011. These 18 articles are categorized into the following seven sessions:

- “Plenary Keynotes” contains summaries of the two plenary keynote addresses, which present inspiring, visionary, and innovative ideas in game theory and its interplay with social and economic considerations within the context of security and trust in complex networked systems.

- “Attacks, Adversaries, and Game Theory” has two articles discussing game-theoretic approaches to intrusion-detection systems and the role of adversaries’ risk profiles.
- “Wireless Adhoc and Sensor Networks” contains three articles, which investigate attacks and defense in infrastructureless wireless communication and sensor networks.
- “Network Games” has three articles focusing on analytical investigations of games related to security problems in networks.
- “Security Insurance” contains two articles on the new field of economic insurance considered as a component of the overall security infrastructure for complex networks and systems.
- “Security and Trust in Social Networks” has four articles investigating, analytically and experimentally, game-theoretic methods in the important area of social networks.
- “Security Investments” contains two articles investigating the value and effectiveness of investments for security mechanisms in the Internet.

Considering that inference and decision making for human-machine networked systems is still an emerging research area, we believe that this edited volume as well as the GameSec conferences will be of interest to both researchers and students who work in this challenging and multidisciplinary area.

November 2011

John Baras
Jonathan Katz
Eitan Altman

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Table of Contents

Plenary Keynotes

- Beyond Nash Equilibrium: Solution Concepts for the 21st Century 1
Joseph Y. Halpern
- Network Security Games: Combining Game Theory, Behavioral
Economics, and Network Measurements 4
Nicolas Christin

Attacks, Adversaries, and Game Theory

- Indices of Power in Optimal IDS Default Configuration: Theory and
Examples 7
Quanyan Zhu and Tamer Başar
- Exploiting Adversary's Risk Profiles in Imperfect Information Security
Games 22
Gabriel Fortunato Stocco and George Cybenko

Wireless Adhoc and Sensor Networks

- An Anti-jamming Strategy for Channel Access in Cognitive Radio
Networks 34
Shabnam Sodagari and T. Charles Clancy
- Node Capture Games: A Game Theoretic Approach to Modeling and
Mitigating Node Capture Attacks 44
Tamara Bonaci and Linda Bushnell
- Multi-variate Quickest Detection of Significant Change Process 56
Krzysztof Szajowski

Network Games

- Interplay between Security Providers, Consumers, and Attackers:
A Weighted Congestion Game Approach 67
Patrick Maillé, Peter Reichl, and Bruno Tuffin
- Network Games with and without Synchronicity 87
Ahmad Termimi Ab Ghani and Kazuyuki Tanaka
- An Asymptotic Solution of Dresher's Guessing Game 104
Robbert Fokkink and Misha Stassen

Security Insurance

Security Games with Market Insurance	117
<i>Benjamin Johnson, Rainer Böhme, and Jens Grossklags</i>	
<i>Aegis</i> : A Novel Cyber-Insurance Model	131
<i>Ranjan Pal, Leana Golubchik, and Konstantinos Psounis</i>	

Security and Trust in Social Networks

Maximizing Influence in Competitive Environments: A Game-Theoretic Approach	151
<i>Andrew Clark and Radha Poovendran</i>	
Collaborative Location Privacy with Rational Users	163
<i>Francisco Santos, Mathias Humbert, Reza Shokri, and Jean-Pierre Hubaux</i>	
Digital Trust Games: An Experimental Study	182
<i>Tansu Alpcan, Albert Levi, and ErKay Savaş</i>	
Colonel Blotto in the Phishing War	201
<i>Pern Hui Chia and John Chuang</i>	

Security Investments

Investment in Privacy-Preserving Technologies under Uncertainty	219
<i>Murat Kantarcioglu, Alain Bensoussan, and SingRu(Celine) Hoe</i>	
Modeling Internet Security Investments: <i>Tackling Topological Information Uncertainty</i>	239
<i>Ranjan Pal and Pan Hui</i>	
Author Index	259