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Serious Games as a Tool to Understand Complexity in Market Competition: An Evolutionary Game Theory Simulation Platform

Short Bio:
Yves Caseau joined AXA on April 3rd, 2014, as Head of the Digital Agency of the Group. Yves Caseau reports both to the Group CMO and the Group CIO; he is responsible for driving the priorities of AXA's Digital Agency, which are to foster innovation throughout AXA and to accelerate the development of digital products and services, especially on mobile.
Dr. Yves Caseau was, until February 2014, Bouygues Telecom's Executive Vice-President in charge of New Products and Innovation. His key responsibility was to design and to build "triple play" products (internet gateways and TV set top boxes). Previously, he has been Bouygues Telecom's Chief Information Officer (CIO) from 2001 until 2006.
Yves Caseau graduated from the Ecole Normale Superieure (Paris), holds a PhD in computer science and a MBA from the "College des Ingénieurs". He is a member of the National Academy of Technologies and the author of books about information systems, lean management and enterprise organization.

Abstract:
Complex systems resist analysis and require experimenting or simulation. Many enterprise settings, such as competition in an open market or "co-opetition" with partners, are complex and difficult to analyze, especially if one wishes to accurately figure the behaviors of other companies. This talk describes an approach towards modeling a system of actors which is well suited to enterprise strategic simulation. This approach is based upon game theory and machine learning, applied to the behavior of a set of competing actors. Our intent is not to use simulation as forecasting – which is out of reach precisely because of the complexity of these problems – but rather as a tool to develop skills through what is commonly referred as "serious games", in the tradition of military war-games. Our approach, dubbed GTES (Game-Theoretical Evolutionary Simulation), is built upon the combination of three techniques: Monte-Carlo sampling, searching for equilibriums from game theory, and local search meta-heuristics for machine learning. The core idea is to run a large number of evolutionary search for Nash equilibriums, where the unknown parameters from the competition model are sampled in a Monte-Carlo approach. The result is landscape of market positions and associated pricing strategies, which is best experienced as a game. We illustrate this approach with a "Systemic Simulation of Smart Grids", as well as a few examples drawn for the mobile telecommunication industry.