

## Information Security Analysis Using Game Theory and Simulation

### Disclosure Number

201202961

### Technology Summary

The disclosure relates to cyber security systems and more specifically to the use of game theory. Information security analysis can be performed using game theory implemented in dynamic simulations of Agent-Based Models (ABMs). Such simulations can be verified with the results from game theory analysis and further used to explore larger scale, real world scenarios involving multiple attackers, defenders, and information assets. Our approach addresses imperfect information and scalability that allows us to also address previous limitations of current stochastic game models. Such models only consider perfect information assuming that the defender is always able to detect attacks; assuming that the state transition probabilities are fixed before the game assuming that the players' actions are always synchronous; and that most models are not scalable with the size and complexity of systems under consideration. Our use of ABMs yields results of selected experiments that demonstrate and teach our proposed approach and provides a quantitative measure for realistic information systems and their related security scenarios.

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