Proactive Infrastructure Security: From Evolutionary Approaches to the Use of Cellular Automata

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ABSTRACT

The main objective of the paper is to propose several novel approaches to security of complex infrastructure systems, which can be utilized in the development of a class of computer tools for infrastructure protection. First, the paper introduces the concept of proactive infrastructure security and compares it with reactive security. The comparison is done in the context of the generation and evaluation of both the terrorist and security scenarios, which are also introduced and described. Next, the paper discusses both the evolutionary and co-evolutionary generation of terrorist and security scenarios and discusses various computer tools, which have been developed at George Mason University for infrastructure protection. Finally, the paper briefly overviews the concept of cellular automata and proposes how cellular automata could be used in the development of computer tools for infrastructure protection. The paper ends with the initial research conclusions and various suggestions for further research.

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