

12TH ICCRTS

“Adapting C2 to the 21st Century”

Applying Spatial-Temporal Model and Game Theory to Predict Dynamic Asymmetric Threats in Hostile Environments

Suggested Topics: Modeling and Simulation (Track 2)
C2 Technologies and Systems (Track 8)
C2 Concepts, Theory, and Policy (Track 1)

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ABSTRACT

Applying Spatial-Temporal Model and Game Theory to Predict Dynamic Asymmetric Threats in Hostile Environments

In recent years lots of models and techniques have been applied to symmetric adversarial situations such as wargaming or criminal cases and plenty of prediction results can be resorted to. However, asymmetric adversaries faced by U.S. forces become more and more frequent and satisfying predications are still quite difficult to obtain.

In this paper, a new framework for modeling dynamic changes of features and predicting future threats is proposed. In this framework, techniques that can provide concrete spatial-temporal modeling and prediction, higher level hybrid data fusion, emotion analysis of adversary rationality and non-rationality, deception identification and modeling, hierarchical knowledge representation, and non-zero sum stochastic adversarial Markov game are combined semantically. We mainly describe the modification of existing spatial-temporal point-model, the fusion of dynamic game feature selection technique and dynamic cohesiveness feature selection technique, the ontology about selected/unselected features, and building of the probability predictions.

Outline:

1. Introduction
2. Technical Approach
3. Simulations and Experiments
4. Conclusions

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References