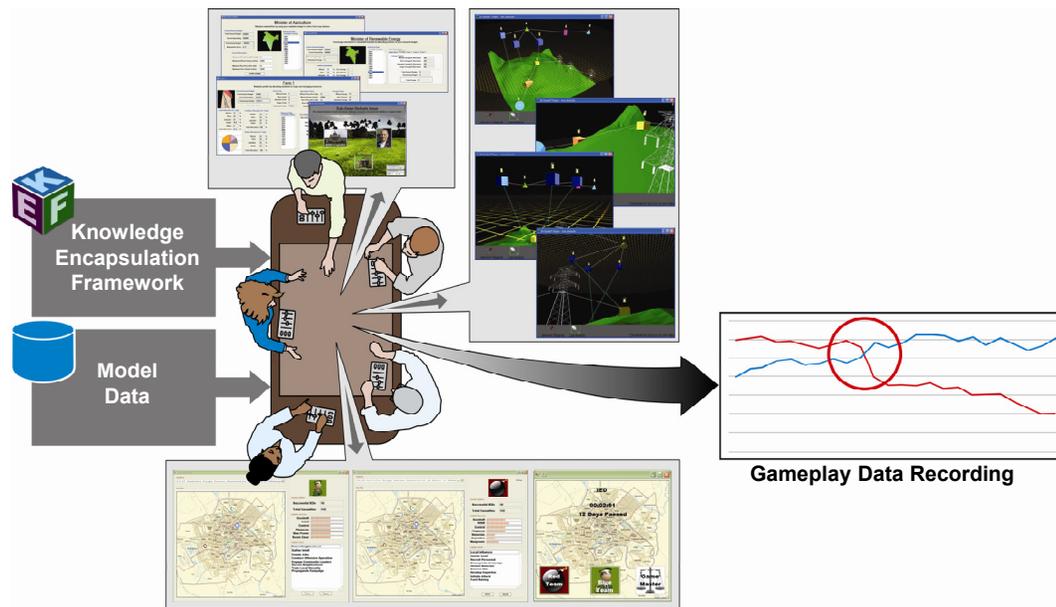


Analytical Gaming



Technical Approach

- Develop a definition of the components of Analytical Games (AG) at a general level.
- Build a reusable framework architecture that—given an AG definition—serves as the control driver and data collection engine for game exercises, and provides hooks for a variety of user interface options.
- Define the processes by which models and analysis tasks are mapped into an AG definition.
- Apply all of the above to develop proof-of-concept AG prototypes.

Challenges

Computers still lack many of the distinct properties that allow humans to reason about what they observe, to make judgments, and to alter their behavior as a result. So, how do we best engage human experts in tandem with the ever-expanding suite of computational models and tools in such a way that humans and computers can work together more effectively to generate insights regarding potential futures?

Solution

With gaming technologies, we can produce an environment in which the ingenuity of human players and the computational power of modeling systems are brought together in consideration of a problem scenario, with actions and results recorded to allow post-game analysis.

Technosocial Predictive Analytics Initiative

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Analytical Gaming

Objective

To better understand how and why a complex scenario—particularly one in which human behavior plays an important role—may play out. The same people (e.g., intelligence community, business analysts, energy policy analysts) who currently use various forms of serious games and gaming exercises can benefit from the use of AG. The use of AG will help make their processes more repeatable and facilitate development of analysis tools that can be applied to the outputs of multiple games (i.e., analysis tools relating to player moves and communications need not be built in to a specific game).

Current Practices

Serious games (referring to computer games) are widely used for training purposes, and to a lesser degree for analysis purposes. Computer games developed for analytical purposes may make use of reusable game engines, but do not often make use of a well-defined framework by which common data collection and analytical processes may be employed, instead using *ad hoc* processes. This results in games that are tightly coupled to a specific analysis task or project. Role playing exercises are used for more “free range” games, in which players have more latitude to decide what actions they wish to take, and a human Game Master (GM) adjudicates the results of player actions. Communication tools may be used to facilitate these games. We see a gap in the space between tightly coupled computerized games and non-computerized role playing exercises, and believe we can provide tools and techniques that will help to bridge that gap.

Analytical Gaming Approach

We are addressing challenges related to the use of computational models by creating a framework and process by which AGs are crafted. AGs are scenario-based, model-driven exercises, in which the definitions and outputs of predictive models are used to formulate a game environment. Players then assume roles and interact with the game environment and other players to achieve role-specific objectives. Actions and results are recorded to provide data for post-game analysis.

The Transformational Change

This environment provides a platform to leverage the combination of computational power and human intellect, to explore a range of possibilities. The processes of game definition and play help to make models relatable and identify areas of potential interest for future modeling tasks.

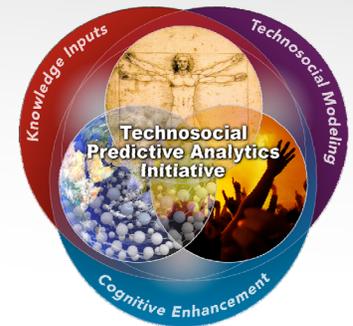
Outcomes

- Application of lessons learned from initial prototype developments—refining our interaction process with modelers
- Add capabilities for capture and analysis of player communications (external to models)
- Integration of Knowledge Encapsulation Framework capabilities to enable GMs to “inject” events into an ongoing game exercise.
- Define and implement a prototype game related to the year 3 focus area: Illicit Trafficking
- Provide a demonstration of the Analytical Gaming outcomes in the context of an end-to-end TPAI demonstration.

The Technosocial Predictive Analytics Initiative (TPAI)

is taking the next steps to addressing complex, interwoven issues with highly integrated, innovative models to help analysts and policymakers identify and counter strategic surprise.

TPAI supports a multi-perspective approach to predictive analysis through integrated reasoning, drawing knowledge insights from both the natural and social sciences.



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