Strategy Mapper: Coloring the Gray

Abstract

Brittany Kondo, David Sheffield, William Wright

Uncharted Software Inc.

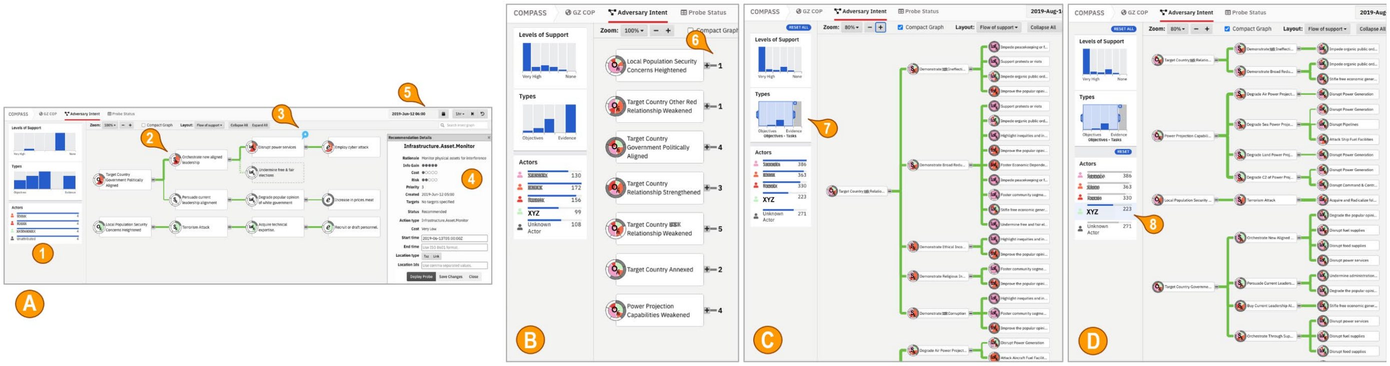

Figure 1: Strategy Mapper Intent Graph. **A**) Hypotheses of competitor strategies are shown in an intent graph hierarchy from left to right of objectives, strategies, lines of effort, tasks and evidence. 1) Facets on left characterize features of the intent graphs and allow filtering to features of interest. 2) The level of support or likelihood for each node is shown as well as estimates for actor attribution (see Fig 4). 3) Probe pushpin shows the focus of a deployed information-seeking probe. 4) Probe details in a drill-down. 5) Simulation time controls. **B**) **C**) and **D**) The display is interactive with varying levels of detail, filtering and zoom. B-6) Hierarchy is collapsed to only show top level objectives. C-7) The focus is on objectives, strategies and lines of effort. D-8) The focus is on nodes that include Actor xyz attribution.

Abstract

Strategy Mapper is a visual analytic tool for human-machine decision making in complex situations with uncertainty in estimating and understanding a competitor's intent and tactics. Users can compare and reason through multiple hypotheses about one or more competitor's behaviors, and consider recommendations to probe for more information. Using the "Gray Zone" as an application example, a user evaluation exercise shows the methods are usable and effective.

Keywords: Reasoning, Human-Machine Analysis, Visual Representation Design.

Index Terms: Probabilistic Reasoning Human Machine Interface, Visual Analytics, Strategy Analysis

1 Introduction - "Gray Zone" Competition

Strategy Mapper allows analysts and decision-makers to consider multiple hypotheses for potential strategies that a competitor may be using, and to weigh their respective evidence and likelihoods. In researching and developing Strategy Mapper, Gray Zone competition has been used as the application domain. In Gray Zone (GZ) competition, state and non-state actors pursue objectives of changing a status quo without the use of overt force. Examples are found in the South China Sea, Ukraine and Middle East [31][20].

Activities are incremental over time with modest actions that erode an opponent's political, economic, social and/or territorial environment [31]. Simultaneous goals in multiple domains might be pursued. Techniques are multi-dimensional and include information, propaganda, cyber, economic pressure, support to sub-state entities (e.g. organized crime, militant groups, separatist factions), infrastructure disruption, corruption, election interference, intimidation, and are often mutually reinforcing [5][20]. Actors, strategies and actions are frequently subtle, ambiguous, deniable, covert or unknown to avoid a provoking a response [31]. This contributes to Gray Zone parties and strategies not being easily identified [5]. There is limited clarity of intent [3]. Strategies embody multiple, and seemingly contradictory, truths at the same time [19][3].

2 Contributions

The key contributions in this paper are as follows:

• We present new interactive visual analytic processes to understand and work with the uncertainty regarding competitor reasoning and competitive environments in inter-connected, multi-faceted, complex situations.
• Multiple linked view visualizations and compound icons to work with computational models of complex competitor behavior and strategies, with diverse uncertainty, making characteristics visible, without overwhelming novice or expert users.
• User evaluation demonstrates the methods are usable for complex situations and achieve task performance objectives.

The paper is organized with: Section 3 an overview of related work, Section 4 discusses the design process, Section 5 describes the Strategy Mapper system, Section 6 illustrates the system with a sample use case, Section 7 reports on the evaluation, and in 8 we provide concluding remarks and future work.

3 References

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4 Note

This paper was prepared for IEEE VisWeek 2020 but was restricted to limited distribution. The paper is available upon request to qualified recipients only. Contact William Wright for details.