Evolution and Revolution within Intelligence Analysis – Using Knowledge Discovery and Inference Technology in Highly Compartmentalized Data Spaces Pertaining to International Crime and Terrorism

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The practice and performance results of intelligence analysis have been affected dramatically over the past decade by two major factors in particular. First, the intensity of information diversification, particularly in data types, media, languages, and available countermeasures against detection, acquisition, and interpretation. Through the globalization of the internet, cellular and wireless media, and defensive software tools, persons and organizations wishing to conceal and to encrypt complex and voluminous communications and other data traffic are better equipped than ever, not only with technology but with the simple volume of data. Finding the proverbial "needle in the haystack" has become something more like finding the needle within the entire barn and pasture.

Second, hyper-compartmentalization of information within government agencies and especially private contractor companies operating in the counterterrorism field especially has created immense challenges for the effective use of even very sophisticated intelligence tools such as knowledge discovery and inference learning algorithms. Despite the increase in compute power and the sophistication of database and knowledge management tools, and in spite of mandates for improving inter-agency cooperation, there has been a difficulty to keep up with the mounting data, to cultivate expertise among populations of new analysts, and to efficiently share information with "need to know" groups and individuals, even where security and secrecy protocols are not an issue.

We present first an analysis of how intelligence analysis has traditionally been conducted with respect to information gathered from a variety of sources and how some valuable methods and styles of searching, knowledge acquisition, and interpretation are not being easily identified or understood by the larger community. We then examine how new resources and tools can be used to assist in the capture and recognition of these cognitive methods including heuristics that even the intelligence analyst may not recognize or understand about herself or himself as an analyst.

Next we address how these "KDI" tools can be very valuable for bridging the gaps and overcoming the barriers that result from intensive data compartmentalization. We note that even if such compartmentalization were reduced or modified within organizational and/or personnel structures, a very positive measure in its own right, such actions do not diminish the ability of criminals and terrorists to deliberately take advantage of the information bottlenecks and saturation of both analysts and agencies. Therefore, a set of remedies and modifications is necessary if the intelligence analysts of the present and future are to avoid situations such as the lead-in to the Sept. 11 attacks.

We describe present research and testing in knowledge acquisition, discovery and inference modeling, including graphical and probabilistic reasoning networks, that is enabling the intelligence analyst to both convey expertise to others and to apply successful strategies from one problem set to another, with the benefit that over time the database and its software "agents" can begin to notice associations and relations that a human being, due to any number of reasons including "no need to know" privileges or simply information overload, would be apt to miss.