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Collecting the Dots

Problem Formulation and
Solution Elements

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SCIENCE AND TECHNOLOGY

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Summary

The prevailing view in the intelligence and public safety communities is that forestalling major threats such as terrorist attacks or epidemics requires weaving together disconnected pieces of information to reveal broader patterns; in more common terms, we call this “connecting the dots.” In this paper, we argue that connecting the dots is less likely to happen unless one takes a prior step: “collecting the dots,” that is, bringing scattered pieces of information into some proximity to each other to enable pattern recognition. This paper is intended to help decisionmakers understand the dimensions of solving the problem of “collecting the dots.” Any solution involves identifying what information is important and improving its circulation within communities that are in a position to connect the dots so collected. The paper describes organizational and informational barriers to “collecting the dots” and explores the characteristics of potential solutions to overcoming them.

Assumptions and Methodology

We made three basic assumptions about the scope of the problem. First, we restricted the problem at hand to dealing with explicit information rather than with knowledge management as a whole. Second, we focused on understanding how to collect and communicate dots on new or rare phenomena the existence of which is indicated by the dots (that is, by newly collected or reconsidered information).

And third, we looked primarily at how information is identified and shared in large communities. In this context, “large” means greater than the size (variously defined as between 50 and 200 people) at which everyone in the community knows one another.

We analyzed several historical examples of well-known failures to “collect the dots” in order to identify those things that might encourage or discourage collection. Next, we reviewed a subset of the literature on information networks, knowledge management, and institutional communication, enhancing our understanding not only of what we know about aspects of our problem but also highlighting those areas where gaps in our understanding occur. We also created and ran a heuristic model that simulated the flow of information within an organization, in an attempt to understand variations in the flow of “useful” versus “misleading” information.

Barriers

There are four major barriers to circulating the right kinds of information within communities.

- *Lack of awareness.* People who possess notable information may not be aware of its notability and thus may not circulate it widely. As such, an important aspect of awareness may involve recognizing when one possesses some of the “dots” and therefore needs to circulate information to help others assemble the “bigger picture.”
- *Lack of attention.* Attention is the obverse of awareness. Whereas awareness leads to information flow, attention focuses on information received. Attention needs to be highly selective; paying attention to too many “dots” decreases the likelihood that significant items will receive needed attention.
- *Inadequate templates.* Templates are generalized patterns based on experience that help people understand new situations. In some cases, past experience does not map usefully onto new information. Observers may try to squeeze new information into

templates prematurely or to fit information into inadequate, inappropriate templates, thus closing off potential avenues of interpretation.

- *Compartmentalization*. Sometimes people in subcommunities tend (for security and bureaucratic reasons) to keep information to themselves. This careful guarding keeps information from circulating, thereby preventing dot collection.

Some Solution Approaches

In one sense, the problem of collecting the dots is one of promoting information-sharing in order to accelerate the detection of critical phenomena. To some extent, solutions that promote the sharing of information correspond to the barriers cited (e.g., networking helps to mitigate compartmentalization). In other respects, just as biochemical excitation agents do not simply suppress inhibiting agents, some solutions take the barriers as given and try to overcome them in other ways.

Networking

Information-sharing requires some kind of networking. Physical networking that connects machines can be a valuable tool in bringing disparate pieces of information into proximity. Social networks that connect people are just as important, but can be more difficult to institutionalize. For one thing, communities may not be well-defined, and community boundaries may not always be clear. Individuals known as “connectors,” who know and speak with many people within an organization, may have an important role to play in bolstering social networks.

Roles and Responsibilities

In any process that addresses the problems of circulating information, there are at least three types of roles: decisionmakers, perceivers, and connectors. Clarifying the responsibilities of each of them within organizations or communities can improve communications.

Collaboration

Collaboration in this case means getting the right people together in the right situation. Mechanisms may be needed to overcome a built-in reluctance to collaborate. One of the biggest challenges to promoting collaboration is getting people to share information that they alone possess.

Categorization

“Binning” similar pieces of information into consistent categories enables both machines and people to collect dots.

Hybrid Approaches

An approach that combines human and machine capabilities is promising, because it can exploit the unique capabilities of each.

Solution Frameworks

A formal process for collecting the dots should incorporate a significant role for human expertise, including heuristic tools for pattern recognition and relationships based on experience and knowledge. One possible framework would include five essential activities:

1. An in-box monitor that captures and sorts information;
2. A synthesizer that establishes contexts for messages and helps identify candidate templates for categorizing them and adding information about relationships;
3. An analyzer that picks out and juxtaposes related information, while assessing each component;
4. A decision tool that interacts with the community’s decision-makers to determine and evaluate next steps; and
5. A connector that takes output from the fourth stage and transmits it to the right audiences.

Connecting the dots requires collecting the dots. Ultimately, these two activities are not separate and distinct. Further research to

examine and refine the concepts introduced in this paper would look for a set of institutional and technological arrangements that would improve the likelihood of both successful collection and connection.