

## “Connecting the Dots”: from data processing to pattern processing

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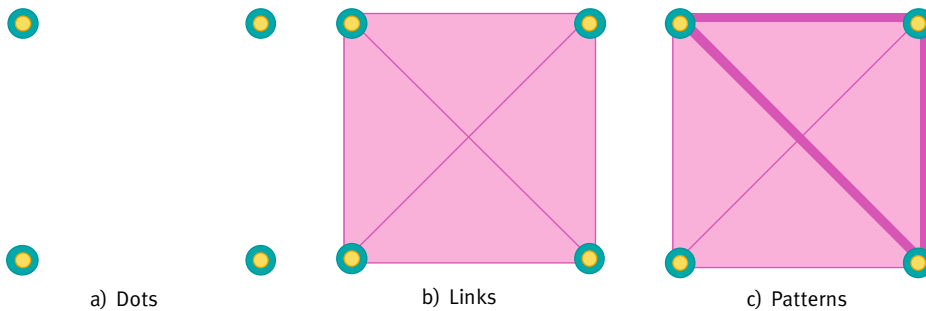


Figure 1 Dots, Links and Patterns

What has been the institutional response to asymmetric threats of the type presented by Al-Qa’ida? In July 2004, Thomas Keane, chairman of the *National Commission on Terrorist Attacks on the United States*, stated that the US government had been unable to protect Americans against the terrorist attacks of September 11, 2001 because of “failures of imagination, policy, capabilities and management” in a national security bureaucracy designed for the Cold War era. (From the *International Herald Tribune*, Friday July 23rd, 2004. ‘A ‘failure’ to protect U.S.’). The Commission’s interim reports had already chronicled how the FBI, the CIA and others had failed to communicate with one another and had thus failed to “connect the dots” or to figure out from numerous clues what was afoot before Sept. 11.

Writing in the July 12th 2003 edition of *The Economist*, however, six of America’s most experienced intelligence practitioners argued that although there had been a failure “to connect the dots” what was really needed was more useful dots to connect, more fine-grained and better quality data and more monitoring based on the data. In most of the western countries targeted by Al-Qa’ida operatives, we now face a significant increase in surveillance and consequently a growing threat to civil liberties. Nevertheless, we believe that pleading for more dots is to mistake the nature of the problem posed by international terrorism, and that even recognizing the significance of the information is a task that exceeds the capacity of a single organization such as the CIA. Consider Figure 1 where the relationship between dots, links and patterns is highlighted.

An arithmetic increase in the number of “dots” to play with — high quality or otherwise — leads to a geometric increase in the possible connections or links that one can establish between them and to an exponential increase in the number of *patterns* that can be generated from connected dots. From this figure we can derive Table 1 below:

Number of dots	Number of possible links $L = N(N-1)/2$	Number of possible patterns $P = 2^L$
N = 4	L = 6	P = 64
N = 10	L = 45	P = 3.5 trillion
N = 12	L = 66	P = 4,700 quadrillion

If 4 dots lead to 6 possible links – as indicated in Figure 1 - it also generates 64 possible patterns. Add 6 further dots and you get 10 dots generating 45 possible links and approximately 3.5 trillion possible patterns. Now add a further 2 dots and you are dealing with 66 possible links but with approximately 4,700 quadrillion possible patterns. The implication of this table is that whatever we feel about the need for more high quality dots to connect—and we are not denying that the need is a real one— if we are not to drown in a sea of unprocessable data, we also need to find a way of identifying *meaningful* patterns among the much larger number of those that are meaningless. Even if you don’t get the pattern, you get the picture.

This need for variety reduction brings us to an important if much misunderstood distinction between data, information, and knowledge. Simplifying somewhat, dots are environmental signals that register with an agent as data – things that attract our attention because they are anomalous. Links between dots constitute information that an agent extracts from the data, and the patterns that can be derived from such information when properly filtered can become actionable knowledge for the agent.

The intelligence challenge is thus one of *pattern processing* rather than of simple *data processing* – ie, processing dots. The two are really quite different. The latter might just be carried out by one organization, no matter how intelligent. The former needs to be distributed to those best placed to sift out significant from insignificant patterns: those closest to the action.

If pattern processing is so much more challenging than data processing, it cannot be done by the intelligence services alone. The only way to deal with the challenge is to apply the concept of *neighbourhood watch* to problems of terrorism and security and to do so on a global basis. It will pose in a novel way the question: who is my neighbour? Hopefully it will be someone located in Peshawar who is as disgusted with the terrorist phenomenon as I am. But how, then, do I relocate my potential neighbour in Peshawar into a “love” loop and out of a “fear” loop? Clearly, we are dealing here with a hearts-and-minds issue, and unfortunately, not one that current institutional players have proved very attentive to or competent in dealing with.

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