

Science's Next Big Score

Forget matchmaking. Researchers should use social networks to land matching funds.

BY BRUCE STERLING

If the capital of the art world is New York, the capital of electronic art is Linz, Austria. For 25 years, the city's annual Ars Electronica festival has showcased innovative projects that bridge the gap between art and science. At this year's event, an alien influx of suit- and tie-wearing R&D

consultants joined the two disciplines in a powerful new way. At a symposium titled "Language of Networks," a panel of mathematicians and graphics geeks dazzled a standing-room-only crowd with elaborate diagrams of social networks. Social network analysis has been around since the 1930s, but only recently has it become automated. It's still more art than science, but it's fast becoming indispensable for nailing opinion leaders, locating hubs of influence, and tracing flows of ideas.

Social network analysis maps the connections between people or organizations to see who exchanges information with whom. The resulting pictures look like a cross between a bucket of Mardi Gras beads and an overturned bowl of fruit. It's easy to see which nodes communicate directly with the greatest number of peers, which have ready access to the bulk of the network and which connect disparate clusters.

At Ars Electronica, these works easily upstaged the less prosaic art (especially Gerhard Dirmoser's finicky yet explosive analysis of Ars Electronica itself). Like fractals, they're nearly impossible to create by hand, so they strike the eye with the somber, unchallengeable authority of, say, aerial photographs.

The most impressive diagrams at the symposium came from FAS.research of Vienna, which touts its graphs as a high tech solution to the problem of funding science and, by implication, art. Allocating

money for scientific research has always been highly problematic. Science just doesn't sit still for the usual forms of cost-benefit measurement, and in any case, how are bean-counters to understand the arcane stakes of bleeding-edge research?

Social network analysis offers an ingenious answer. When it comes to scientific research, the most important gauges of success are peer review and citation. Who is citing whom, and how often? Mapping these relationships and distilling them into a single eyeful reveals which projects have the most impact.

Yet social network analysis raises troubling questions. Do these computer-rendered tangles correspond to any sort of reality? A social network map is a buffer zone between funders and fundees. It looks and feels better than gut instinct or, worse yet, pork barreling. "You see, Professor, we gave all the euros to your worst rival because he is this large blue dot here in this center of vectors! You are merely that small pink dot on the benighted periphery." And off the professor goes, shoulders slumped.

In the hands of law enforcement officials, social network analysis is like a chainsaw, both useful and dangerous. Saddam Hussein was captured with the aid of link diagrams that revealed his vulnerable connections, not just to the major malefactors in his government but to low-ranking yet highly trusted bodyguards, chauffeurs, and fellow

tribesmen. On the other hand, imagine what malevolent authorities with a McCarthyite bent might do with such a tool: "Several Web pages link your site, Volvo Owners for Free Expression, to those of terrorists. Surely this proves something."

Indeed, any serious effort to analyze a social network is bound to startle its members. Josh On's interactive map at www.theyrule.net is a jaundiced portrait of the American corporate elite and its interlocking boards of directors. It seems likely that the people named in its graphs feel no particular solidarity. On the contrary, these bitterly competitive overachievers probably hate one another's guts. Bill Gates, Michael Dell, and Larry Ellison are tightly connected by any conceivable social network measure, but this doesn't mean they brew one another hot cocoa at Christmas.

Properly used, though, this kind of analysis could work wonders. Imagine a brilliant scientist who has been working for decades in undeserved obscurity, never having scratched the right old-boy backs. A network graph could make the worthy researcher pop out of the background while outing the usual lazy timeservers as pigs with their trotters in the trough. Imagine the transformative mayhem that would wreak on the moribund status quo! And if it brought the supposedly hostile realms of art and science closer together, then we'd have every reason to rejoice.

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