Web Science Meets Network Science

A pair of divergent scientific communities discusses their similarities and differences, and search for common ground.

EVER SINCE WORLD Wide Web inventor Sir Tim Berners-Lee announced the Web Science Research Initiative in 2006, researchers have been trying to map the boundaries of Web science, which spans a dizzying range of disciplines including computer science, economics, government, law, and psychology.

Complicating matters further has been the parallel evolution of a markedly similar-sounding field: Network science, whose devotees explore the characteristics of all types of networks, from neural networks to social networks to, yes, the Web.

Where do these two emerging fields overlap? Where do they diverge? These are some of the questions a group of scholars broached in the Third International Workshop on Network Theory, hosted last March at Northwestern University.

"In one sense, Web science is a subset of network science. In another sense, network science is a subset of Web science," says workshop co-chair Noshir Contractor, a professor of behavioral sciences at Northwestern.

Proponents of the former view argue that the Web is just one network among many that share certain common properties; for example, they are open, scale-free, and exhibit emergent properties like power laws. Proponents of the latter view tend to argue that the Web is fundamentally different from other networks in that it encompasses a broad range of human concerns that have little to do with a macro understanding of networks, such as issues of government policy, commerce, and human factors.

"In practice, Web science is focused on how we could do things better, while network science is more focused on how things work," says
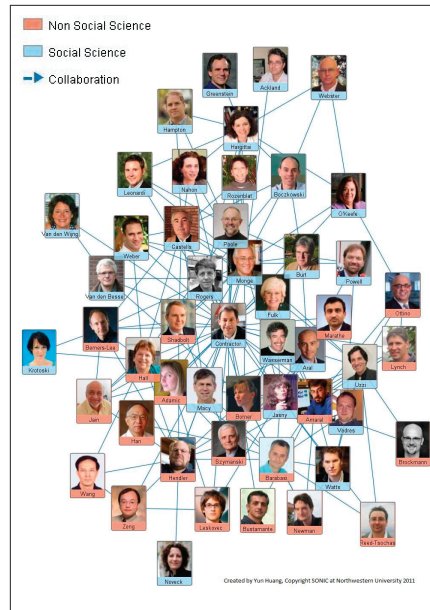
Collaboration network map of the participants of the Northwestern University workshop.

Contractor, "but aspirationally, they are not different."

Given their overlapping areas of interest, it might seem surprising that many of the leading researchers in each field remained largely unaware of the others' work before they met for the first time at the Northwestern workshop.

"This was a coming together of two different communities," says Dame Wendy Hall, a professor of computer

Where do these two emerging fields overlap? Where do they diverge?

science at the University of Southampton, who is one of the cofounders of the Web Science Research Initiative and now the managing director of its successor, the Web Science Trust.

Like so many good ideas, the idea for the workshop originated over drinks at a hotel bar. Hall remembers having a lively conversation with network theorist Manuel Castells during a meeting of the European Research Council. "We realized that we were coming at the same thing from different angles," Hall says. Soon afterward, Castells introduced Hall to Contractor, initiating a series of conversations that led to the Northwestern workshop.

The workshop organizers hoped to frame a new research agenda by leveraging the commonalities and distinctive contributions of Web science and network science, and to formulate questions of interest to both communities.

The two-day conference covered a wide range of broadly related topics such as debating the merits of network science's "pure" scientific approach vs. the more applied, engineering-oriented tactics of Web science; analyzing the effects of scale on network behaviors; exploring questions of causality, correlation, and inference; and discussing the possibility of a Web index, an idea currently being promoted by Berners-Lee.

Looking ahead, plenty of room exists for continuing dialogue between the two camps, who will almost certainly continue to probe each other's boundaries while searching for common ground.

"Is Web science a subset of network science or is it the same thing?" asks Hall. "The answer is, It doesn't matter." C

Alex Wright is a writer and information architect based in Brooklyn, NY.