CACM Reports: Reshaping Terrorist Networks with Novel Algorithms

August 2014 Issue Reports on Progress on Maximum Flow Algorithms; Specialized Software Engineering Degrees; and Pragmatism for Intellectual Property

Identifying terrorists whose removal would maximally destabilize their networks saves civilian and military lives as well as financial costs, write University of Maryland researchers who developed a software platform to achieve this goal. Known as STONE (Shaping Terrorist Organization Network Efficiency), this platform relies on reward programs and capture operations based on three novel algorithms. Using four real-world terrorist network datasets, the authors showed how to infer a probability distribution on possible new networks that result from removal of a set of terrorists. These tactical approaches to defeating terrorist operations are necessary for populations at risk, and their integration with strategic incentives to defeat terror groups should be weighed.

- Andrew V. Goldberg and ACM A.M. Turing Award recipient Robert E. Tarjan survey basic techniques behind efficient maximum flow algorithms, used for finding a feasible flow through single-source networks such as pipelines that connect oil wells to oil depots. They report that, though maximum flow algorithms have a long history, revolutionary progress is still being made, citing intriguing directions that have yielded new results.

- Perceiving a mismatch between the skills needed for entry-level software developers and typical computer science programs provided to students, Rochester Institute of Technology professors launched the first undergraduate software engineering program in the U.S. in 1996. The resulting specialized software engineering degree was designed to prepare graduates for professional positions in commercial and industrial software development. By combining engineering design, software product development, teamwork, and communication, the program racked up a track record of growth and more than 90% placement of graduates.

- Recent advances in understanding how people search suggest that in certain scenarios, a search engine could take significantly longer than a fraction of a second to return relevant content, say researchers from Microsoft and the University of Michigan. They propose the concept of slow search, where search engines use additional time to provide a higher-quality search experience than is possible with conventional time constraints.

- Ownership of intellectual property is fast becoming the battleground in the 21st century, says Communications of the ACM Editor-in Chief Moshe Y. Vardi. He notes that fundamentalist ideas rarely work over the long term, and urges the Open Access movement as well as society to take a more pragmatic approach to intellectual property, including the evolution of access models for scholarly information.

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