Countering social influence and persuasion of extremist groups

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Social media has become a vital channel for terrorist groups to share news and seduce new members. The recent, notable successes of ISIS in the U.S. and Europe have demonstrated that terror groups can successfully use this approach to further their agenda of violence. While it gets less attention, it is equally important for groups that are sharing and communicating information to counter extremist Muslim discourse.

The problem is, how can those looking to counter the violent ideology of groups like ISIS monitor and analyze all the conversations to determine what is a significant danger? How can groups countering violent extremism leverage social media to limit the diffusion of extremist ideology?

Arizona State University will lead new research aimed at helping to solve this puzzle. It has been selected to receive a highly competitive Minerva grant to gain a better understanding of what types of information "go viral" and under what circumstances.

The ultimate goal will be the development of a new logic-based framework to better understand the mindset and motivations of extremist groups. This will help intelligence officials better predict what viral conversations different communities will align with, or what information spikes may lead to real on-the-ground threats. This may, in turn, support new methods for devising and executing counter-messaging strategies.

The Minerva Initiative is a Department of Defense (DoD)-sponsored, university-based social science research initiative launched by the Secretary of Defense in 2008 focusing on areas of strategic importance to U.S. national security.

This is the second time ASU has been chosen to receive a Minerva award. The university was selected for an inaugural grant in 2009 and collaborative research from that project culminated in internationally-recognized work, including a Best Paper award at the IEEE (Institute of Electrical and Electronics Engineers) International Conference on Social Computing in 2013.

"This new project is a transdisciplinary approach to identify core features and underlying mechanisms of information cascades, in which tens and in some cases hundreds of thousands of individuals participate to spread information and opinions across the globe," said principal investigator Hasan Davulcu, associate professor in the Ira A. Fulton Schools of Engineering and director of ASU's Cognitive Information Processing Systems Lab.

According to Davulcu, a faculty member in the School of Computing, Informatics, and Decision Systems Engineering and an expert in developing novel data mining techniques and tools, information cascades can indicate short-term rumors, fads, or can point to longer-term social movements. Some, including those used to recruit "foreign fighters" for groups such as ISIS, and others that oppose violence and promote interreligious and intercultural understanding, are of critical significance.

The project team includes experts in the social sciences and computer engineering from ASU, the United States Military Academy at West Point and Exeter University in the United Kingdom. Many worked on the previous Minerva project.

They are employing computational and ethnographic methods to determine the degree of correspondence between virtual and on-the-ground communities. Specific areas to be studied are Southeast Asia (Indonesia and Malaysia), West Africa (Nigeria), Western Europe (United Kingdom) and the Middle East (Iraq and Syria).

The overarching objective is to develop novel measurement and analytic technologies for detecting information cascades and understanding the ideological orientations of participating communities. A trans-disciplinary team and methodology will be used to identify core features and underlying mechanisms. Specifically, the project aims to develop algorithms and tools to detect groups experiencing highest rates-of-change, characterize the types of change, and identify their key drivers.

"The types of communication that move people to act in real communities also moves people in virtual communities. It can start with a rumor or reaction to an event, it can spread via word of mouth, or by Twitter or Facebook," said project investigator Paulo Shakarian, assistant professor in the School of Computing, Informatics, and Decision Systems Engineering and director of the Cyber-Socio Intelligent System Lab at ASU. He is and author of the forthcoming book on information cascades, Diffusion in Social Networks.

"It is impossible to monitor all of the conversations, so we have to get better at identifying the ones to which we should be paying attention," he said. "This requires embedding psycho-social models in a logic programming framework that can gather and analyze social networks, specific attributes of individuals and their relationships to others."

An objective is to identify the issues and grievances that make individuals and diverse groups come together and form a coalition, despite their divergent views on many other issues. It is equally important to identify what drives them apart.

Project investigators, with the help of cultural consultants, will examine the collective behaviors of online communities, including their key or core symbols (i.e. images, videos, words and phrases), heroines and heroes, and their ideological orientations. This will take place alongside online surveys to determine extremist tendencies and personality types, media studies, and on-the-ground interviews and meetings with local area experts.

"We can't rely on computer science, alone," Davulcu said. "There are moments in time when key issues get identified. In Egypt, for example, prior to the 2011 revolution the Kefaya [meaning 'enough'] movement opposing the political corruption and stagnation of Hosni Mubarak's regime and its cruelty, coercion and disregard for human rights, drew its support from across Egypt's political spectrum - bringing together diverse groups. These types of movements can work for and against stability depending on the violent or non-violent paths they take."

ASU's Minerva grant is situated in its Center for the Study of Religion and Conflict, which incubates new research into the complex role of religion in human affairs. The center also led ASU's initial Minerva project.

"The transdisciplinary environment of ASU has really enabled us to bring together faculty in innovative ways," said Linell Cady, director of the center. "The fact that we have developed two successful Minerva projects is a real testament to the way in which integrating the deep knowledge of the humanities with cutting edge computer science can produce a whole much greater than the sum of its parts."

In addition to Davulcu and Shakarian, members of the research team include:

- Luke Gerdes, a Minerva fellow in the sociology program of the

United States Military Academy's Department of Behavioral Science and Leadership. He is a prominent network scientist with specialties in dark networks and violent non-state actors.

- Jonathan Githens-Mazer, associate professor in entho-politics at the University of Exeter in the UK. His research examines nationalism, radicalization, terrorism, and counter-terrorism, and how to use technological innovation to buttress and improve qualitative research and ethnography.
- Baoxin Li, associate professor ASU's School of Computing, Informatics and Decision Systems Engineering and director of the Visual Representation and Processing Laboratory. He will lead research efforts related to visual media processing and retrieval, in particular face and logo detection and recognition from on-line images and videos.
- Mark Woodward, associate professor in ASU's School of Historical, Philosophical and Religious Studies. He is a cultural anthropologist who has published extensively on political Islam, religion, violence and terrorism, and the dynamics of radical and counter-radical movements. Woodward was the primary investigator for ASU's previous Minerva effort.

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