

Dynamics of Trust and Information Sharing



S&T Campaign: Information Sciences
Science of Cyber Security

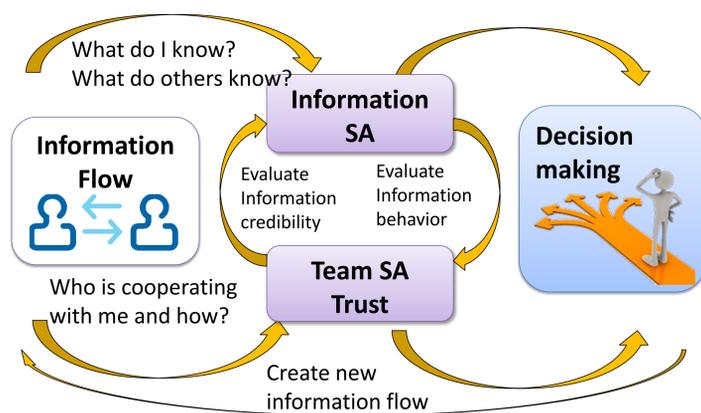
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Research Objective

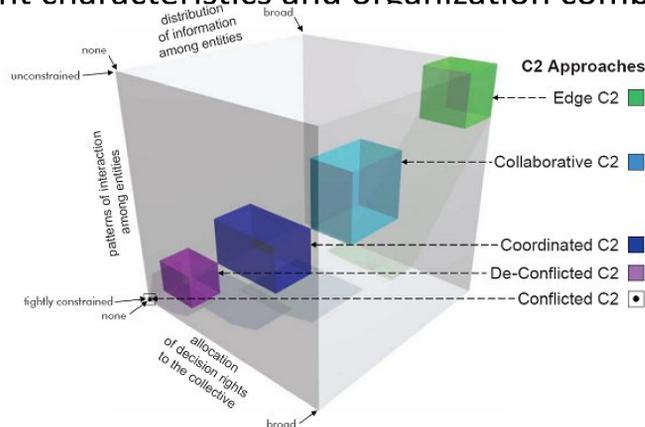
- Methods and models to measure and enhance human trust in decision making involving information provided and gathered by networked sources
- Understand the impact of individual-level social drivers and mechanisms on macro-level behaviors such as opinion dynamics and influence in social networks



Information flow, Evolution of Trust and Decision Making

Challenges

- **Existing distributed agent platforms lack both granularity of representation and analytical capability:** Develop a distributed agent model and experiment framework that captures information sharing behavior, trust evolution and decision making
 - Generation of extensible software agent model and associated information sharing scenario
 - Understanding of tradeoffs of parameters of scenario and in agent characteristics and organization composition

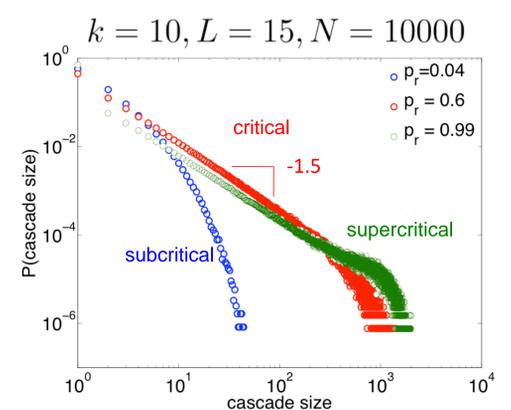


- **Lack understanding of the impact of information cascades:** Develop a model to study the propagation of information cascades in an environment where users have limited attention to devote to their message feed. These models and theories will aim at ability to predict emergent properties of social systems associated with tipping points

ARL Facilities and Capabilities Available to Support Collaborative Research

Research Results/Insights:

- Agent based simulation framework TANDEM to study information sharing scenario, trust evolution, and multi-genre network parameters
- Model and preliminary analysis of information cascades. Analysis showing phase transitions from subcritical to super critical where cascades have non-zero probability of becoming viral.



- Close collaboration with research partners in the Network Science Collaborative Technology Alliance
- Member of multinational technical research groups: NATO SAS-085 C2 and Requisite Agility (recipient of 2014 NATO Scientific Achievement Award) and SAS-104 C2 Agility: Next Steps

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Require significant modeling and simulation and analysis with **validation using real world data** and generalization to other scenarios and other networked contexts
- **Need extensive human in the loop experiments** and/or large scale/volume data collection or experiment for validation purposes

Publications

- Adali, Chan, Cho, "TANDEM: A Trust-based Agent Framework for Networked Decision Making," accepted to CMOT (invited), Oct. 2014.
- Chan, Cho and Adali, "A Trust-Based Framework for Information Sharing Behavior in Command and Control Environments," 22nd Conference on Behavior Representation in Modeling and Simulation (BRiMS), San Antonio, TX March 2013, (Best Paper Award).
- Sreenivasan, Chan, Swami, Korniss, Szymanski, "Modeling the effect of attention on cascades in feed-based networks," Temporal Networks, Human Dynamics and Social Physics, NetSci'14 Symposium, Berkeley, CA, June 2014.