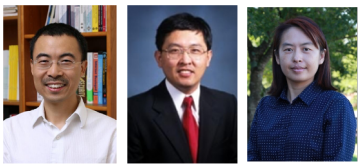
Collaborative: Online Social Network Fraud and Attack Research and Identification



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Online Social Network (OSN) users face various forms of fraud and attacks. This research
- embraces a systematic, comprehensive study of OSN fraud and attacks
- models, analyzes, and characterizes OSN fraud and attacks
- designs, develops, and evaluates a new approach to detecting OSN collusive fraud and attacks in the graph spectral space
- enhances this approach to handle dynamic attacks with multiple phases

Key Challenges

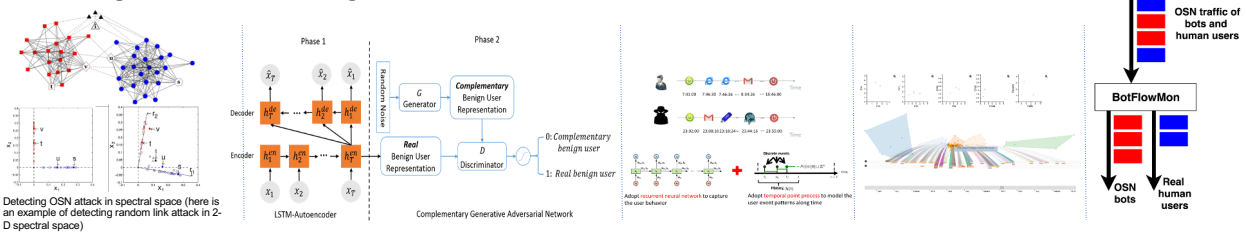
- Ever-evolving OSN fraud and attack space
- OSN data size and complexity
- Few labeled training data
- Little ground truth
- Inefficient interactive attack detection
- Limited research access to OSN platforms

Scientific Impact

- Pushed the state-of-the-art in OSN fraud and attack detection
- Advanced theoretical understanding of spectral graph analysis
- Advanced the art and techniques of applying machine learning and deep learning to computer security
- Applied visualization for computer security

Approach and Contributions

a. Spectrum-based attack detection
b. One-class generative adversarial networks for fraud detection
c. Neural temporal point processes for dynamic attack detection
d. Explainable visualization of collaborative vandal behaviors in Wikipedia
e. Learning-based, content-agnostic identification of social bot traffic flows



(a) (b) (c) (d) (e)

Broader Impact (society)

- Less OSN social bot damage
- Better online reviews
- Insights for defense against Wikipedia vandalism

Broader Impact (education and outreach)

- Curriculum development
- Annual Oregon Cyber Security Day

Broader Impact (numbers)

- # of female students involved: 2 (UO), 1 (UNCC)
- # of undergraduate students directly involved: 9 (UO)
- # of MS students involved: 1 MS thesis (UO), 3 (UNCC)
- # of Ph.D. students directly involved: 4 (UO), 3(UofA), 1(UNCC)
- Potentially a new OSN software