UNIVERSITY OF SOUTH FLORIDA

Defense of a Doctoral Dissertation

Data-driven Studies on Social Networks: Privacy and Simulation

by

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For the Ph.D. degree in Computer Science and Engineering

This dissertation focuses on two important studies of social networks: protecting privacy of individuals in publicly available social network data and simulating online user activity in various social media platforms. The first study was motivated by the access and privacy issues of social network data due to the sensitive information they capture. We present a data-driven framework to measure privacy and utility on network data and demonstrate its applicability via extensive experiments on real world social networks. The second study aims to accurately model the information dissemination in social media across various contexts. In this line of work, we propose a data-driven model that forecasts groups of topic-related, overlapping, online conversation trees on Reddit. We improve this model to generate Twitter activity related to a political crisis using signals from contemporary exogenous data, such as news articles and Reddit.

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Publications

1) **Horawalavithana**, **S.,** NG, K. and Iamnitchi A. Drivers of Polarized Discussions on Twitter during Venezuela Political Crisis, 13th ACM Web Science Conference (WebSci), Southampton, UK, 2021 (To Appear)

2) **Horawalavithana**, **S.,** Silva, R., Nabeel, M., Elvitigala, C., Wijesekara, P., and Iamnitchi, I. Malicious and Low Credibility URLs on Twitter during the AstraZeneca COVID-19 Vaccine Development, International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS), USA, 2021 (To Appear)

3) Kin Wai NG, **Horawalavithana, S.,** and Iamnitchi, A. Multi-platform Information Operations: Twitter, Facebook and YouTube against the White Helmets, The Workshop Proceedings of the 14th International AAAI Conference on Web and Social Media (ICWSM), 2021. (To Appear)

4) **Horawalavithana**, **S.,** NG, K. and Iamnitchi A. Twitter is the Megaphone of Cross-Platform Messaging on the White Helmets, International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS), DC, 2020

5) **Horawalavithana**, **S.,** Bhattacharjee, A., Liu, R., Choudhury, N., Hall, L., and Iamnitchi, A. Mentions of Security Vulnerabilities in Reddit, Twitter and GitHub, IEEE/WIC/ACM International Conference on Web Intelligence (WI), Thessaloniki, Greece, October 2019

6) **Horawalavithana, S.,** Flores, J., Skvoretz, J., and Iamnitchi, A. Behind the Mask: Understanding the Structural Forces that Make Social Graphs Vulnerable to De-anonymization. IEEE Transactions on Computational Social Systems (TCSS), 2019

7) **Horawalavithana, S.,** Flores, J., Skvoretz, J., and Iamnitchi, A. The Risk of Node Re-identification in Labeled Social Graphs, Applied Net. Sci. (2019)

8) **Horawalavithana, S.,** Gandy, C., Flores, J., Skvoretz, J., and Iamnitchi, A. Diversity, Topology, and the Risk of Node Re-identification in Labeled Social Graphs., The 7th International Conference on Complex Networks and Their Applications. Cambridge, UK, Dec. 2018

9) Liu, R., Mubang, F., Hall, L., **Horawalavithana, S.,** Iamnitchi, A., and Skvoretz, J., Predicting Longitudinal User Activity at Fine Time Granularity in Online Collaborative Platforms, 2019 IEEE Inter- national Conference on Systems, Man and Cybernetics (SMC), Bari, Italy, 2019.

10) Alhazmi, E., **Horawalavithana, S.,** Blackburn, J., Skvoretz, J., and Iamnitchi, A. An Empirical Study on Team Formation in Online Games. In Proceedings of the IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM), Australia, 2017

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