Proposal Defense
Doctor of Philosophy in Information Science

Tracking Extremist Narratives: Detection, Explanation, and Evolution in Online Spaces
by Muheng Yan

Date: June 26, 2024
Time: 10:00 a.m. – 12:00 p.m.
Place: Room 828, Information Sciences Building, 135 North Bellefield Ave., Pittsburgh PA 15260

Committee:
- Yu-Ru Lin, Associate Professor and Advisor, Department of Informatics and Networked Systems, School of Computing and Information
- Daqing He, Professor, Department of Informatics and Networked Systems, School of Computing and Information
- Konstantinos Pelechrinis, Department of Informatics and Networked Systems, School of Computing and Information
- Rebecca Hwa, Professor & Department Chair, Computer Science, George Washington University

Abstract:
In recent years, extremist violence targeting social, racial, or ethnic groups has surged globally, devastating minorities and threatening national security and democracy. In the online space, narration plays a pivotal role in extremism by enabling extremist groups to disseminate their ideologies widely and persuasively through social media and forums. Understanding extremism narrative frames is crucial because they shape how messages are perceived and internalized, revealing the strategies behind persuasive and impactful stories. By explaining how narrative devices evoke emotions, reinforce identities, and mobilize individuals, we can develop more effective counter-narratives. In this proposal, I plan to proceed with two research components to systematically analyze and explain the composition of extremist narratives and to track their evolution and impact in the digital space.

The first component aims to operationalize and benchmark "Extremist Narrative Frame" through machine learning models, using natural language processing to identify and explain narrative devices in extremist propaganda. This includes creating a benchmark detection model with annotated dataset, and applying a surrogate model for enhanced explainability. The narrative devices considered include characters, plots, settings, and tropes -- commonly recurring motifs or cliché in stories, focusing on their structural and functional roles in extremist narratives. The second component investigates the dynamic evolution of extremist narratives across different temporal and geographical contexts. This involves collecting and analyzing data from various online platforms to understand how narrative devices and framing change in response to significant socio-political events and digital propaganda techniques. The study design includes time-lagged regression models and visualization techniques to depict the flow and impact of extremist narratives over time.

Overall, this proposal aims to advance the theoretical and practical understanding of extremist propaganda, providing a foundation for more effective counter-extremism strategies. The
interdisciplinary approach combines insights from social and computer science, addressing the multifaceted nature of extremist narratives and their influence on radicalization.