

Graduate Mathematics Seminar

Analyzing COVID-19 Twitter Dynamics
Using Nonnegative Matrix and Tensor Decompositions

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Abstract: Analyzing social media using topic models has become popular for studying and tracking various public health events around the world. During the COVID-19 pandemic, Twitter has experienced increased usage including discussion and dissemination of information relating to the COVID-19 pandemic. We analyze Twitter text data related to the pandemic using four unsupervised topic modeling techniques, specifically nonnegative matrix factorization (NMF), nonnegative CP tensor decomposition (NCPD), online NMF, and online NCPD. We illustrate each of these methods as a dynamic topic modeling technique, revealing latent themes in the data with emphasis on temporal evolution. We compare the various advantages of the methods and how they incorporate temporal information, and showcase that the topics identified may be used to gauge how discussions among the public change over time, even in tumultuous circumstances. We find that tensor methods capture more topics that are present primarily over short time periods compared with NMF and online NMF. Further, we demonstrate that online counterparts to NMF and NCPD produce similar results and are viable alternatives that allow for processing much larger amounts of data without subsampling.

When: Monday, September 21st, 2020, 6:00 – 7:00 pm

Where: Online, via Zoom