



AToMS: Author-Topic Manifold Summarization for Interpretable Author Collaboration Forecasting

Presenter(s): Conrad Hougen

Advisor(s): Alfred O. Hero, Karl T. Pazdernik

Institution Name: University of Michigan, Pacific Northwest National Laboratory

Presenter's Email Address: chougen@umich.edu

Abstract:

In nuclear nonproliferation, models of author behavior critically reveal how information sharing and information propagation occur within the nuclear science community. In particular, longitudinal topic models provide insights into time-evolutionary topic trends within specific document corpora. By combining such longitudinal document-topic models with related author-topic models, we present a novel approach to the problem of co-authorship prediction. Our approach makes clear the benefits of using topic modeling to forecast author behavior, providing a richer interpretation than standard methods in bibliographic link prediction. Specifically, our model predicts the existence and topic of unobserved author collaborations, while generating visualizations of topic trajectories. We demonstrate that our model is scalable due to the usage of fast similarity search for manifold learning. We apply our method to several article databases, both for comparison and to generate insights relevant to nuclear nonproliferation. Furthermore, we provide encouraging quantitative comparisons between our approach and known methods in bibliographic link prediction.