

## ASONAM 2020 Tutorials

### **Tutorial I: Perils and Promises of Automated Hate Speech Detection**

**Roy Ka-Wei Lee and Rui Cao**  
Singapore Management University

#### *Abstract*

Online hate speech is an important issue that breaks the cohesiveness of online social communities and even raises public safety concerns in our societies. Motivated by this rising issue, researchers have developed many traditional machine learning and deep learning methods to detect hate speech in online social platforms automatically. This tutorial aims to introduce the pressing problem of online hate speeches and demonstrate state-of-the-art hate speech detection methods. The tutorial is meant to be a ``start-up" guide for researchers interested in understanding the online hate speech problem and intend to conduct further research into this critical problem. No particular background is expected from the audience.

#### *Bio*

**Roy Ka-Wei Lee:** Roy Ka-Wei Lee is an assistant professor in the Design and Artificial Intelligence (DAI) programme and Information Systems Technology and Design (ISTD) pillar. Previously, he was an Assistant Professor of Computer Science at the University of Saskatchewan, Adjunct Faculty at School of Information Systems, Singapore Management University, and Research Scientist at the Living Analytics Research Centre. Roy's research lies at the intersection of data mining, machine learning, and social computing, where he has published several papers in top conferences and journals on these research areas. Currently, Roy is leading the Social AI Studio, which aims to understand user behaviours and design the data-driven systems and algorithms for improving user experiences in online social platforms.

**Rui Cao:** Rui Cao is currently a PhD student at the school of Information System, Singapore Management University. Her research interests are natural language processing, machine learning, and data mining. Specifically, she is interested in multimodal NLP, visual question answering (VQA) and hate speech detection.

## **Tutorial II**

### **Knowledge Graphs: A Practical Introduction across Disciplines**

**Mayank Kejriwal**  
University of Southern California

#### ***Abstract***

Knowledge Graphs (KGs) like Wikidata, NELL and DBPedia have recently played instrumental roles in several machine learning applications, including search and information retrieval, natural language processing, and data mining. The simplest definition of a KG is as a directed, labeled multi-network. Yet, despite being ubiquitous in the communities mentioned above, KGs have not witnessed much research attention in the network science and social network communities. With the rapid rise in Web data, there are interesting opportunities to construct domain-specific knowledge graphs, including over social media data. We propose a tutorial that will provide a detailed and rigorous introduction to KGs, and a synthesis of KG research and applications in multiple areas of computer science and AI, including e-commerce, social media analytics and biology.

#### ***Bio***

**Mayank Kejriwal:** Dr. Mayank Kejriwal, a research assistant professor and research lead at the University of Southern California's Information Sciences Institute (USC/ISI). He is affiliated with the Center on Knowledge Graphs at USC/ISI. His research focuses on knowledge graphs (KG), an exciting area of AI that has found widespread applications in industry (including Amazon and Google), academia (health informatics and social sciences) and for social causes (fighting human trafficking and crisis response). He has given talks and tutorials in international academic and industrial venues, most recently serving as a roundtable speaker and participant at the Concordia Summit that was co-held with the UN General Assembly in New York City in September, 2019. He is also the upcoming author of an MIT Press textbook on knowledge graphs, and he authored the popular Springer Brief 'Domain-specific Knowledge Graph Construction' in 2019.

## **Tutorial III**

### **Network-Oriented Modeling and Analysis for Adaptive Networks**

**Jan Treur**

Vrije Universiteit Amsterdam

#### ***Abstract***

This multidisciplinary tutorial addresses the challenging topic of modeling and analysis of adaptive networks with inherently complex behaviour. Networks usually can be modeled using neat, declarative and conceptually transparent structures specifying connectivity, aggregation and timing characteristics that define a network structure, including characteristics for its internal node dynamics. For adaptive networks involving changing network structure, it is different. Traditionally, procedural specifications are added for the adaptation process, leading to a not very transparent, hybrid specification, part of which often is more at an algorithmic or programming level than at a neat declarative modelling level.

This tutorial presents a modeling and analysis approach that makes the design and analysis of adaptive network models easier: also the adaptation process is modeled as a network, by a self-model that is added to the base network. A self-model is a subnetwork that represents (adaptive) network structure characteristics such as connection weights by its (dynamic) nodes. This approach lifts the network adaptation process to the same declarative modeling level as used for the base network, so that it can be understood, designed and analysed without any need of algorithmic or programming skills. Moreover, it also becomes easy to address second- and higher- order adaptive networks by just applying the approach in an iterative manner. A freely downloadable dedicated software environment is available to run these adaptive network models from their high-level specifications (used as input in the form of specific tables), and to support analysis of their adaptive and perhaps complex behaviour (for example, in relation to empirical data).

Various examples of adaptive mental networks and adaptive social networks will be addressed. Among the network adaptation principles covered are bonding by homophily, triadic closure, preferential attachment, and interaction connects (for adaptive connectivity characteristics), and adaptive node excitability and timing (for adaptive aggregation and timing characteristics). In addition, also second-order network adaptation principles such as inhibiting adaptation, adaptive adaptation speed, and adaptive persistence of adaptation will be covered.

Main reference: Treur, J. (2020). Network-Oriented Modeling for Adaptive Networks: Designing Higher-Order Adaptive Biological, Mental and Social Network Models. Springer Nature Publishers.

#### ***Bio***

**Jan Treur:** Jan Treur works as a full professor in Artificial Intelligence. He is an internationally well-recognized expert in human-directed AI and cognitive and social modelling. He has been and still is active both by author and PC member roles in practically all relevant conferences and journals in these areas. His research during the past 10 years mostly concerns network-oriented modeling and analysis. This covers methods and techniques

for modelling and analysis in a number of application areas, including biological, (neuro)cognitive, social, and health science areas. Part of his research on network- oriented modeling and analysis is described in two books published in 2016 and 2020, where the last book focusses on adaptive networks in particular. Applications cover (multi-order) adaptive network models for biological, mental and social processes that can be used as a basis for human-aware or socially aware AI systems and virtual agents. More details can be found at URL [https://www.researchgate.net/profile/Jan\\_Treur](https://www.researchgate.net/profile/Jan_Treur).

## **Tutorial IV**

### **Accelerated Large Scale Network Analysis using RAPIDS**

**Brad Rees, Corey Nolet**  
NVIDIA

#### ***Abstract***

The ability to collect data has exploded, drastically increasing the size (nodes, edges, and attributes) of networks to be analyzed and opening a range of new analytic techniques. Unfortunately, more data equates to more headaches as analysts spend 70- 90% of their time cleaning and preparing data, just to leverage tools that do not scale. A review of popular SNA tools shows that many assume that data has been prepared before beforehand. A new holistic approach is needed, where ETL, Graph, and ML work together. The RAPIDS open-source GPU software libraries, incubated by NVIDIA, gives analysts the power to execute end-to-end analytic pipelines fully on GPUs. Through the use of a familiar DataFrame API, which integrates machine learning and graph algorithms, RAPIDS enables analysts to interact with their data without losing their train of thought. This tutorial walks through several SNA problems, introducing the various components and features of RAPIDS.

#### ***Bio***

**Brad Rees:** Brad Rees is a Sr. Manager in the AI Infrastructure group at NVIDIA and lead of the RAPIDS cuGraph team. Brad has been designing, implementing, and supporting a variety of advanced software and hardware systems for over 30 years, specializes in complex analytic systems, primarily using graph analytic techniques for social and cyber network analysis. His technical interests are in HPC, machine learning, deep learning, and graph. Brad has a Ph.D. in Computer Science from the Florida Institute of Technology.

**Corey Nolet:** Corey Nolet is a Data Scientist & Senior Engineer on the RAPIDS cuML team at NVIDIA, where he focuses on building and scaling machine learning algorithms to support extreme data processing at light speed. Corey has over a decade experience building massive-scale analytics platforms for HPC environments in the defense industry. Corey holds BS. & MS. degrees in Computer Science and is currently working towards his PhD with a focus on scaling unsupervised machine learning algorithms. Corey has a passion for using data to make better sense of the world.