The Hong Kong University of Science and Technology

Department of Information Systems, Business Statistics and Operations Management

Webinar Announcement

# Fool Me Twice, Shame on Me: Structural Balance Theory Based Deep Learning Model for Identifying False Information


by

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**Time** : **9:00 am - 10:30 am (Hong Kong Time)**

**Zoom Details** : **Click here to join Zoom**
**Meeting ID: 996 3406 8604**
**Passcode: 156374**


## Abstract:

False information distorts and disrupts our society in many areas ranging from politics to the economy. In today's world where online information is proliferating in an unprecedented way, a big challenge is to determine whether or not to believe the information we encounter. However, we often fail to make the right decision since the amount of information published is overwhelming, rendering it impossible for an individual to manually check every source of information. Ironically, this flood of information provides us with an opportunity to capture the characteristics of deceptive or false claims. That is, it is now possible to effectively learn what characterizes false information by analyzing a large amount of both true and false claims published online. Especially, state-of-the-art machine learning approaches (e.g., deep neural networks and attention-based methods) have produced practical results in the task of false information identification (FII). However, the current methods are still far from perfect and there is a large margin for improvement. Specifically, we identify some drawbacks of the attention mechanism, a state-of-the-art method in the field of deep learning, viz. (i) the opaque connection between attention weights and outputs and (ii) the attention weights of unimportant words distracting model's decisions. To overcome these drawbacks, we propose a theory-motivated deep learning framework following the design science approach. Specifically, we base our framework on the structural balance theory (SBT) that helps form a signed network of important words in text. This signed network is used to determine the consistency between the text from a claim and its evidence. Our approach outperforms existing methods in FII tasks with varying levels of complexity. Additionally, in contrast to past studies that have relied primarily on engineering, our theory-based approach, which applies a psychological theory to natural language processing and machine learning, provides additional advantages such as generalizability and interpretability. This study not only paves the way for many future studies but also generates value for multiple stakeholders ranging from news media publishers to business marketers.


## Bio:

I am a PhD candidate in the Department of Management Information Systems at the Eller College of Management, the University of Arizona. I am also working as a research associate at the INSITE Center for Business Intelligence and Analytics. My research centers around theory-driven design science in prescriptive analytics. Specifically, I emphasize the role of theories in computational modeling that produces solutions for real-world problems. Prior to joining the current position, I completed BBA and MS in management information systems at Seoul National University. I have professional experience at the following companies: LG Electronics, Lotte Duty Free, and Kakao.