
**Gaoqing Zhang**

Tepper School of Business, Carnegie Mellon University

**Presentation**

Measuring Information of Accounting Structure: An Information-Theoretic Graph-based Approach

This presentation provides an overview of ongoing research carried out in the Business Language Analytics (BLA) research lab. This research seeks to measure the information embedded in accounting structure and involves two key tasks. The first task is representing the conventional double-entry bookkeeping system in the mathematical language of a directed and weighted graph (or network), leveraging the fundamental identities of accounting, law of motion and aggregation. The second task is developing information-theoretic computational tools, inspired by Claude Shannon's entropy concept, to measure the information in the bookkeeping graph structure. These measures are Balance-sheet Node-entropy, Transaction Edge-entropy, and Bookkeeping Graph (Laplacian) entropy. By applying the Kullback-Leibler divergence (relative entropy) to these metrics, we quantify the new knowledge in current bookkeeping records relative to past records. In some computational experiments, our lab deploys the entropy-based metrics on bookkeeping graphs constructed using financial statement data from publicly traded companies. Our position is that quantifying the bookkeeping graph structure has the potential to offer insights into accounting information transmission, processing, and final end-uses.