**Rumour Detection on Twitter with Tree-structured Recursive Neural Networks**

**Summary**

* Automatic rumor detection
* Learn discriminative features from tweets content
  + By following non-sequential propagation structure
  + Generate more powerful representations for identifying different rumor types
* 2 recursive neural models:
  + Bottom-up (BU); &
  + Top-down (TD) tree-structured neural networks for reumor representation learning and classification
* 2 public Twitter datasets results show:
  + Achieve much better performance than state-of-the-art approaches
  + Demonstrate superior capacity on detecting rumors at very early stage
* Previous studies focus on text mining from sequential microblog streams using supervised models based on feature engineering
  + Largely ignore or oversimplify structural info associated with message propagation
* Kernel-based method: Propagation Tree Kernel
  + Captures high-order patterns differentiating different types of rumors by evaluating similarities between propagation tree structures
  + Cannot directly classify tree without pairwise comparison with all other trees imposing unnecessary overhead
  + Cannot automatically learn high-level feature representations from noisy surface features
* Neural rumor detection approach based on RNN (RvNN)
  + Bridge content semantics and propagation clues
  + Input into model is propagation tree rooted from source post instead of parse tree of individual sentence, each tree node is a responsive post instead of individual words
  + Nodes express stances on parent: Commenting, supporting, questioning or denying
    - Edge arrow - Direction from response to its responded node
    - Polarity marked ‘+’ (‘-’) for support (denial)
    - Same node color - Same stance on veracity of root node (source tweet)
  + Code: github.com/majingCUHK/Rumor\_RvNN