Joint Entity and Relation Extraction (Joint ERE):
- Aim to extract all entities and relations among them in a sentence
- The SOTA method for this task is Marker-based method

Marker-based Methods
- Take Packed Levitated Marker (PL-Marker) model for instance
- Two-stage models: Entity Model and Relation Model
- Neighborhood-oriented Packing for Span (Better Span Representation)
- Subject-Oriented Packing for Span Pair

Issues of Previous Joint ERE Models
1. Error Propagation: Missing entities would never have the chance to be re-predicted for Marker-based Method (SOTA)
2. Joint decoding approaches (e.g. Table Filling methods) are hard to incorporate markers
3. Higher-order relationships among different instances (spans, relations) have not been modeled

Span Pruner
- To alleviate error propagation error, we propose to replace entity model with span pruner model
- Our span pruner is built upon the SOTA PL-marker
- However, instead of aiming to predict all possible entity spans accurately, our span pruner focuses on removing unlikely candidates
- With this new target, our span pruner is able to achieve much higher recall which alleviates the issue of error propagation

Experiment Results
- Our model HGERE achieves the state-of-the-art (SOTA) performance on three Joint ERE benchmarks using BERT-base/SciBERT Backbone
- For analysis, please refer to our paper for more details

Higher-order Inference with Hypergraph Neural Networks
- Ternary Edges (ter), modeling relationship among subject nodes, object nodes and relation nodes (sub-obj-rel)
- Binary Edges, modeling relationship between relation pairs: sibling (sib), co-parent (cop), grand-parent (gp)
- Inference by message-passing: Aggregate messages for each node from adjacent edges with an attention mechanism

Figure 1: Illustration of our framework