Every Document Owns Its Structure: Inductive Text Classification via Graph Neural Networks

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Introduction

- *Text classification importance in NLP.*
- *GNN applied to address limitations.*
- *Introduction to TextING for inductive text classification via GNN.*

Challenges in Existing Methods

- *Lack of contextual word relationships.*
- *Difficulty in inductive learning of new words.*

TextING Approach

- *Individual graphs for each document.*
- *GNN for fine-grained word representations.*
- *Overcoming global structure limitations.*

Method Components

- *Graph Construction: Sliding window for individual graphs.*
- *Graph-based Word Interaction: Gated Graph Neural Networks.*
- *Readout Function: Aggregating word nodes into document embedding.*

Contributions

New GNN approach for text classification.
Generalization to new words.
Experimental superiority over state-of-the-art methods.

Experimental Results

- *Outperforming baselines on benchmark datasets.*
- *Individual graphs excel, especially on MR dataset.*
- *Multichannel variant (TextING-M) potential complementarity.*

Inductive Condition

- *TextING adapts well with reduced training data.*
- *Less impacted by the reduction of exposed words.*
- *Consistent improvement with an increase in unseen words.*

Case Study

- *Attention visualization in sentiment analysis.*
- *Highlighted words correlate positively with the label.*

Parameter Sensitivity

- *Varying interaction steps impact accuracy.*
- *Optimal window size and graph density for effective performance.*

Conclusion

- *TextING addresses challenges in graph-based text classification.*
- *Effective in modeling local word relations and inductive learning.*
- *Experimental results demonstrate superiority and adaptability.*

Future Work

- *Explore further applications and extensions of TextING.*
- *Investigate other graph-based architectures for text processing.*