Prune-and-Score: Learning for Greedy Coreference Resolution
Chao Ma, Janardhan Rao Doppa, J. Walker Orr, Prashanth Mannem
Xiaoli Fern, Tom Dietterich and Prasad Tadepalli

Problem Setup

- Coreference Resolution is the task of clustering a set of mentions in the text such that all mentions in the same cluster refer to the same entity.
- Greedy Search processes each mention from left to right. Choose actions greedily according to a heuristic. “Processed” means an action of that mention has been made.
- Search Space
  - State S: Partial clustering of all mentions up to current mention.
  - Action: MERGE(m, C): merge mention m into the cluster C. NEW(m): start a new cluster that only contains m.

Greedy Search Formulation

- Prune Score Framework
  - Key Idea: Divide-and-conquer by learning two functions;
    - A pruning function \( \Phi_{\text{prune}} \) to prune all the bad decisions based on the specified pruning parameter \( b \).
    - A scoring function \( F_{\text{score}} \) to select the best decision from the remaining actions.

- Loss Decomposition and Learning
  - Overall expected loss \( \mathcal{L} \) equals the error due to pruning the target output \( \mathcal{F}_{\text{prune}} \), plus the error due to not selecting the best output within the pruned space \( \mathcal{F}_{\text{score} \mid \text{prune}} \).

Experiment Results

- Coreference Resolution Results

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