Learning Relational Features with Backward Random Walks

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Knowledge Base Inference
Coordinate Term Extraction

Example Inference rules

Knowledge Base Inference
Coordinate Term Extraction

Path Ranking Algorithm

Path-Constrained Random Walks

Distant Supervision

Combine Forward & Backward Random Walks

Algorithms

Algorithm 1: Cor-PRA Feature Induction

Input training queries \{(x_n, G_n)\}_{n=1}^m
for each query (x_n, G_n) do
1. Path exploration
(i.) Apply path finding to generate paths \(P_n\) up to length \(l\) that originate at \(x_n\).
(ii.) Apply path finding to generate paths \(P_n\) up to length \(l\) that terminate at \(x_n\).
2. Calculate random walk probabilities:
   for each \(x_n, \pi \in P_n\) do
     compute \(P(\pi \rightarrow \pi, x_n)\) and \(P(\pi \leftarrow \pi, x_n)\)
   end for
   for each \(x_n, \pi \in P_n\) do
     compute \(P(\pi \rightarrow \pi, x_n)\) and \(P(\pi \leftarrow \pi, x_n)\)
   end for
3. Generate constant path candidates:
   for each \(x_n, \pi \in P_n\) with \(P(\pi \rightarrow \pi, x_n) > 0\) do
     propose path feature \(P(\pi \rightarrow \pi, x_n)\)
   end for
   for each \(x_n, \pi \in P_n\) with \(P(\pi \rightarrow \pi, x_n) > 0\) do
     propose path feature \(P(\pi \rightarrow \pi, x_n)\)
   end for
4. Generate long (concatenated) path candidates:
   for each \(x_n, \pi \in P_n\) with \(P(\pi \rightarrow \pi, x_n) > 0\) do
     propose long path feature \(P(\pi \rightarrow \pi, x_n)\)
   end for
   for each \(x_n, \pi \in P_n\) with \(P(\pi \rightarrow \pi, x_n) > 0\) do
     propose long path feature \(P(\pi \rightarrow \pi, x_n)\)
   end for

Main Results

KB inference
NE extraction

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<th></th>
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<th>MAP</th>
<th></th>
<th>Time</th>
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