Motivations and Challenges

- Comments on the may mention other locations.
- Task: link those mentioned locations to their profile pages
- Explorations on this problem may benefit
  - Applications: comment search & gathering, target-level sentiment analysis, and (next) location recommendation
  - Generalization to other domains where websites share similar structures: movie (IMDB) & product (Amazon)

Challenges of entity linking in user-generated content

- Variability and ambiguity of entity mentions
- Short & lack of textual context (15 words on average)

Backgrounds

- LSBNs (e.g., Foursquare and Google Maps) host profile pages for fine-grained locations.
- On those profile pages, users can contribute comments, ratings, and likes.

Key Observations on Mention $m = (e_f, a, c)$

- $e^{(m)}$ and $e_f$ are usually connected via some $r$.
- $r$ is often revealed in the context $c$.

Generative Process of FocalLink

1. Draw a relation $r \sim \text{Multi}(\pi)$ to follow
2. Draw a location $a$ to mention
   - $e \sim P_g(e | e_f, r), e \in \mathcal{E}(a)$
   - Estimate $P_g(e | e_f, r)$ by
     - Path-Constrained Random Walk if $r$ is not Near
     - Else, by location-sensitive popularity $P(e | e_f)$
3. Write the surrounding context $c$
   - Like locations, assume that each $r$ has relation-specific words $\theta_r$
   - $P(c | e_f, e, r) = \prod_{w \in c} [\lambda_1 P(w | d_e) + \lambda_2 P(w | \theta_r) + (1 - \lambda_1 - \lambda_2) P(w | D)]$

Foursquare Dataset

- 321,943 locations in Singapore with 442,803 comments
- 4,000 sampled comments, 828 labeled mentions

Baseline Approaches

- Different combinations of popularity, textual context, and distance information
- The baselines benefit from incorporating more information. Modeling $e_f$ and relations to the mentions brings additional gains.

FocalLink learns relation-specific words $\theta_r$.
They help $e$ linked to $e_f$ via $r$ supported by the comment content to gain more credit.

Experimental Results

- Top-10 relation words learnt by FocalLink, sorted by $P(w | \theta_r)$.