Leveraging Order-Free Tag Relations for Context-Aware Recommendation

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### TASK
Context-Aware Tag Recommendation

Input query (contexts) → #poster #conference #mmp #presentation → MODEL (Image Location Time Text)

### Intuition
Hashtags within a post are related to each other (inter-dependency), but the order in which they occur doesn’t matter (orderlessness).

### Previous approaches

#### Ranking Problem: Rarely consider the inter-dependency

#### Generation Problem: Tag dependent on the order

### Our approach
Sequence-Oblivious Generation (SOG)

To alleviate the order impact while leveraging inter-dependent tag relations

### Three key choices devised for tag generation, unlike conventional text generation

#### 1. Model Structure: Encoder-Based Generation

Decoder (Autoregressive, AR): Left-to-right / last token for generating the next tag

- SOG (Encoder) [MASK] token for generating the next tag (identical flow)

#### 2. Training: 1-to-M Optimization

#### 3. Sequence-Oblivious Decoding

- De facto in text generation, maximizing the likelihood of sequence (global)
- Greedy Search
- Optimal for hashtag generation (ranking task), producing most likely hashtag at each step

### Results

![Graph showing performance metrics: BERT Ranking vs AR (1-to-1), AR (1-to-M) vs SOG (1-to-1) vs SOG (1-to-M).]

- SOG architecture outperforms both ranking and standard generation
- 1-to-M training significantly improves further
- The order in a hashtag sequence does not matter

### Takeaways

- Tag information is certainly useful, but the order does not matter
- SOG can alleviate the order impact while leveraging tag relations
- SOG is superior to ranking and conventional generation