Personalized Fashion Recommendation using Pairwise Attention

Donnaphat Trakulwaranont, Marc A. Kastner, Shin’ichi Satoh

✉ donnapat.tra@gmail.com

Introduction

Fashion is one of highest revenue industries, Online fashion shopping has some obstacles: Do not know what is suitable

Motivation

However, fashion recommendation systems have various existing problems:

- Lack of personalization
- Low variety in dataset (types of users and recommended clothing)

We want to make the recommendation system more personalize based on occasion and user’s characteristic

Idea

- Use more personal information
  - More Personalized recommendation
- Form the new recommendation system
  - Recommend more variety clothing types
- Use SFS and Polyvore dataset
  - Low variety in the dataset

Proposed method

Our method can separate into 2 main stages.

1. Recommendation stage
   - It is used for generating recommended clothing item that match to specific user based on their characteristic.
   - The pairwise attention module can generate the weight attention score for each input feature.

2. Query stage
   - Query using output from recommendation model
   - Using GloVe to encode, and Cosine similarity

Pairwise calculation

\[ F = ( f_{\text{season}} + f_{\text{occasion}} + f_{\text{age}} + f_{\text{ethnicity}} + f_{\text{body}} ) \]

\[ W_f = \text{Sigmoid} \left( \frac{1}{|F|} - 1 \sum_{f \in F} f \cdot x^T \right) \]

where \( f \in F \)

\[ F_{\text{pairwise}} = \frac{1}{|F|} \sum_{f \in F} W_f \cdot f \]

Results

The proposed method can provide more personal recommendations and more variety in clothing.

The proposed method provides better performance in mAP and mAR.

Using a survey, the proposed method is preferred by 58% of participant.

Quantitative Result

<table>
<thead>
<tr>
<th>Model</th>
<th>Item recommendation</th>
<th>Attribute recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mAP@5</td>
<td>mAR@5</td>
</tr>
<tr>
<td>VIBE (Comparison method)</td>
<td>0.4859</td>
<td>0.4865</td>
</tr>
<tr>
<td>AFF (Naive)</td>
<td>0.5708</td>
<td>0.5714</td>
</tr>
<tr>
<td>Occasion + Season + Age</td>
<td>0.8039</td>
<td>0.8045</td>
</tr>
<tr>
<td>Occasion + Season + Age + Ethnicity</td>
<td>0.8279</td>
<td>0.8286</td>
</tr>
<tr>
<td>Occasion + Season + Age + Ethnicity + Body shape</td>
<td>0.8311</td>
<td>0.8316</td>
</tr>
</tbody>
</table>

Table 1: Quantitative results comparisons of the proposed method and comparison method

Questionnaire Result

- Number of participants (Ethnicity: Asian)
  - 31 (21 Female, 10 Male)
- Questions
  - 43 queries (Ethnicity: Asian with random occasion, season, age)

<table>
<thead>
<tr>
<th>Model</th>
<th>Female</th>
<th>Male</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparison (VIBE)</td>
<td>9</td>
<td>4</td>
<td>13 (41.94 %)</td>
</tr>
<tr>
<td>Proposed</td>
<td>12</td>
<td>6</td>
<td>18 (58.06 %)</td>
</tr>
</tbody>
</table>

Table 2: Score for each method chosen by participant