Abstract

- We construct E-ConvRec, an authentic Chinese dialogue dataset consisting of over 25k dialogues and 770k utterances, which contains user profile, product knowledge base (KB), and multiple sequential real conversations between users and recommenders.
- We explore conversational recommendation in a real scene from multiple facets based on the dialogue and particularly design three tasks: user preference recognition, dialogue management, and personalized recommendation.
- We establish baseline results on E-ConvRec to facilitate future studies.

Introduction

- Users describe the sought products in broader terms and a casual way, resulting in difficulties in eliciting users' preferences.
- Accurately recognizing user preference words in casual utterances lays the foundation for providing high-quality recommendations.
- Customers usually proceed in a coarse-to-fine manner to gradually make their decisions during a conversation.
- Customer service staffs need to conduct effective interactions with them to collect required information or make a recommendation.
- There are massive personalized user profiles and product knowledge in the E-commerce domain.
- The auxiliary information makes it easy to trace connections from users to specific items and provides a high-quality recommendation for customers.

Data Collection

Our dialogue dataset contains conversations on pre-sales topics between users and customer service staff in an E-commerce scenario and pre-select from a broader set of dialogues.

<table>
<thead>
<tr>
<th>Category</th>
<th>Total cases</th>
<th>Total sessions</th>
<th>Max turns</th>
<th>Max turns</th>
<th>Total turns</th>
<th>Total utterances</th>
<th>Average words per utterance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Knowledge Base</td>
<td>52,609</td>
<td>25,840</td>
<td>305,441</td>
<td>12</td>
<td>100</td>
<td>180</td>
<td>5,782,956</td>
</tr>
</tbody>
</table>

User Profile

We provide 20 different types of user profiles.
- Attributes of users’ personal information.
- Historical shopping activities.

Product Knowledge Base

- KB information of products mentioned in the E-Commerce platform.
- Knowledge of other products in the same category and sell in the same online shop.

Task Formulation & Experiments

User Preference Recognition

Four kinds of preference words: descriptive preference words, category words, comparative preference words, and negative preference words.

- Sequence labeling task.
- Lexicon E-comm dict in the E-commerce domain with a vocabulary size of 722k.

Method

<table>
<thead>
<tr>
<th>Model</th>
<th>w/ CTB dict</th>
<th>w/ E-comm dict</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSTM + CRF</td>
<td>74.00</td>
<td>75.29</td>
</tr>
<tr>
<td>Simple-Lexicon</td>
<td>76.39</td>
<td>75.89</td>
</tr>
<tr>
<td>Multi-Digraph</td>
<td>76.37</td>
<td>77.40</td>
</tr>
<tr>
<td>FLAT</td>
<td>76.60</td>
<td>79.24</td>
</tr>
<tr>
<td>LEHBERT</td>
<td>78.91</td>
<td>78.53</td>
</tr>
</tbody>
</table>

Personalized Recommendation

The task of conversational recommendation is designed to judge whether the user will buy a candidate product based on user profile, product KB and conversation content.

- Click-through rate (CTR) prediction task.
- Basic Features (BF), Interactive Features (IF), Contextual Features (CF).

Case Study

- Green box highlights the product mentioned in the conversation, and the orange one refers to ground truth.