Converse-Et-Impera: Exploiting Deep Learning and Hierarchical Reinforcement Learning for Conversational Recommender Systems
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Background

Conversational recommender systems assist online users in decision making tasks by supporting a goal-oriented interactive process with the aim of narrowing down the user interests until the desired item is obtained.

Research questions

1. Are goal-driven dialogue systems able to effectively support a conversation with the user by dividing it in simpler goals?
2. Are neural network models able to extract relevant evidences from textual documents?
3. Are sequence-to-sequence models able to generate personalized responses according to the user preferences?

Methodology

Converse-Et-Impera is equipped with:

• the meta-controller, which is responsible for selecting a goal in a given turn
• the controller, which selects an action given the state and the current goal

Applies a dedicated representation module according to the specific goal:

• chitchat, used to manage general conversations with the user
• qarecs, used to provide personalized suggestions according to the extracted evidences

Trained by using a two-stage training strategy:
1. supervised learning to learn a preliminary policy for the agent
2. reinforcement learning to allow the agent to learn from its experiences with a simulated user

Results

Experimental evaluation conducted on synthetic dialogues generated from Movielens 1M (ML1M) and MovieTweetings (MT)

Supervised Learning

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<tr>
<th>Configuration</th>
<th>MC precision MT</th>
<th>BLEU MT</th>
<th>F₁-measure MT</th>
<th>Per-user F₁-measure MT</th>
<th>F₁-measure ML1M</th>
<th>Per-user F₁-measure ML1M</th>
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Reinforcement Learning

ML1M

MT