The personalization of dialog systems is a meaningful task, which has not received much attention in the past few years. Here is an example to see what is wrong with conventional content-based goal-oriented dialog systems.

The conversations happen in a restaurant reservation scenario. The first and the second dialogs are with a young male with non-vegetable dietary, and the third one is with an elderly female with vegetable dietary.

These problems in the above example reflect three common issues with current models:

1. The inability to adjust language style flexibly.
2. The lack of a dynamic conversation policy based on the interlocutor’s profile.
3. The incapability of handling ambiguities in user requests.

Correspondingly, the goals of personalization in goal-oriented dialog systems are solving these issues.

Our model, PERSONALIZED MemN2N, is in the vein of the memory network models for goal-oriented dialog, consisting of three main components: profile embedding, global memory and personalized preference.

- The incoming user utterance is embedded into a query vector. The model first reads the memory (at top-left) to find relevant history and produce attention weights. Then it generates an output vector by taking the weighted sum followed by a linear transformation.

- Part (1) is Profile Embedding: the profile vector \( p \) is added to the query at each iteration, and is also used to revise the candidate responses \( r \).

- Part (2) is Global Memory: this component (at bottom-left) has an identical structure as the original MemN2N, but it contains history utterances from other similar users.

- Part (3) is Personalized Preference: the bias term is obtained based on the user preference and added to the prediction logits.

We conduct experiments on the personalized bAbI dialog dataset (Joshi et al., 2017) and consider the following baselines: Supervised Embedding Model, Memory Network (Bordes et al., 2017), and Split Memory Network (Joshi et al., 2017).

Our model, PERSONALIZED MemN2N, wins the MemN2N baseline with 27.6% and 14.3% higher in terms of task completion rate and satisfaction, with \( p < 0.03 \).

References

Links
- website: www.luolc.com/publications/personalized-goal-oriented-dialog/