Personalized Neural Conversation Model

Background:

The recent advances in memory and attention mechanisms for neural networks architectures have led to remarkable progress in machine translation, question answering and other language understanding tasks which require an element of logical reasoning. The main motivation for building neural network based systems over traditional systems for such tasks is that they do not require any feature engineering or domain-specific handcrafting of rules.

An important yet unexplored aspect of end-to-end neural dialog systems is the ability to personalize the chatbot's responses based on the profile or attributes of who it is interacting with. For example, a restaurant reservation system should ideally conduct dialog with the user to find values for variables such as location, type of cuisine and price range. It should then make recommendations based on these variables as well as certain fixed attributes about the user (dietary preference, favorite food items, etc.). The register (or style) of the language used by the chatbot may also be influenced by certain characteristics of the user (age, gender, etc.) [1]. However, there are no open datasets which allow researchers to train end-to-end dialog systems where each conversation is influenced by a profile with multiple attributes attached to it. [6]

Existing work:

We already extended the first five synthetically generated tasks (T1-T5) of Facebook bAbI goal-oriented dialog dataset [4]. The extended dataset requires the dialog system to leverage a user's profile information to alter speech style and personalize reasoning over the KB in addition to performing each subtask. The goal is to make a restaurant reservation chatbot personalized to the user's attributes (dietary preference, favorite food items, etc.).
Besides the extended dataset, initial results have been obtained using supervised embedding models [4, 5] and memory networks [2, 3].

Your Task:

1. You will start with playing with the exiting extended dataset and models to get familiar with the problem setting for future work.
2. Extending or handcrafting the dataset could be done after you get familiar with them
3. Analyze the exiting methods and improve them to fit the problem setting. New models can also be proposed and tested for the personalized setting.

Requirement:

- Experienced with Python or other script languages.

- Familiar with machine learning, especially NLP & deep learning.

- Quick leaner and passionate about the topic.

Reference:

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[4] Bordes A, Weston J. Learning end-to-end goal-oriented dialog[J]. arXiv preprint arXiv:1605.07683, 2016.
[5] Dodge, J., Gane, A., Zhang, X., Bordes, A., Chopra, S., Miller, A., Szlam, A., and Weston, J. (2016). Evaluating prerequisite qualities for learning end-to-end dialog systems. In Proc. of ICLR
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