A Comparative Study on Schema-Guided Dialogue State Tracking

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Introduction

Flight Service 1 and 2 shares overlapping functionalities while using different intent/slot tags. Without retraining, can a dialog model trained on Flight Service 1 also support Flight Service 2?

We study the following three research problems (Q1, Q2, Q3) on four subtasks:
• Intent
• Requested Slot
• Categorical Slot
• Non-Categorical slot

Q1: Dialog & Schema Description Encoding

Q2. Supplementary Training

Q3. Impact of Description Styles

How supplementary training helps?
• SNLI only helps for Intent (emphasizing the whole sentence entailment), although Req and Cat are also sentence-pair classification tasks.
• SQuAD consistently helps for non-categorical slot identification tasks, due to span-based retrieving.
• Supplementary training helps more on unseen services.

How supplementary training helps?

Homogeneous Evaluation

Is named-based description enough?
• Most name are meaningful, and perform not bad, especially on Intent/Req subtasks.
• Rich description outperforms the name-based on NonCat, but inconsistent on other tasks.

Is question format helpful?
• It generally helps on Cat/NonCat.
• Adding it to rich description will benefit more from SQuAD-2 supplementary training on unseen.
• However, not on MultiWOZ.

Heterogeneous Evaluation

What if unseen service in different description styles?
• For unseen styles, all tasks suffer from inconsistencies, though to varying degrees.
• For paraphrased styles, richer description are relatively more robust than named-based descriptions.

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