LIHLITH
Learning to Interact with Humans

Learning to Interact with Humans by Lifelong Interaction with Humans

Long Title

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Executive Summary

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1 Introduction

Life Long Learning is defined by [**?**] as follows:

Definition 1.1. Lifelong machine learning (LML) is a continuous learning process. Given that the learner has learned N tasks. When faced with the $(N + 1)$th task the learner leverages past knowledge to help learn the new task. The goal is to optimize on both the new task and the previous tasks. The three components are: contiuous learning, knowledge accumulation and maintenance and leverage past knowledge to learn new tasks.

This definition is quite general and can be applied broadly to different scenarios. In this work, we focus on the application of the definition on dialogue systems. Based on this, we derive a general evaluation framework, which can be applied to dialogue systems in the life long learning setting.

2 Life Long Learning for Dialogue Systems

2.1 Apply the Definition

There are different types of dialogue systems: task-oriented systems, conversational agents and question answering systems. There are several components to life long learning, which need to be applied to dialogue systems.

Tasks refer to the capabilities of the dialogue system. There are different dimensions (i) new skills to learn, e.g. talking about the weather or ordering a new item. (ii) learn a new domain, e.g. learn to talk about hotels when trained on restaurants.

Continuous learning in the case of dialogue systems, the learning is done thought interaction with its users. Over time large amounts of dialogues get stored, from which new skills can be learned. Furthermore, implicit and explicit feedback from the users can be used to improve the dialogue system. Moreover, the dialogue system can recognize requests, which it cannot successfully complete yet.

Knowledge accumulation and maintenance depends strongly on the dialogue system. One source of accumulated knowledge are the past dialogues, these can be used to improve the dialogue system. Another form of knowledge accumulation is in the form of facts: extract new facts from conversations and expand an existing knowledge base.

Leverage past knowledge to learn new tasks

2.2 Examples