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ÚSTAV POČÍTAČOVÉ GRAFIKY A MULTIMÉDIÍ

STYLIZED NATURAL LANGUAGE GENERATION IN DIALOGUE SYSTEMS

GENEROVÁNÍ STYLIZOVANÉHO LIDSKÉHO JAZYKA V DIALOGOVÝCH SYSTÉMECH

BACHELOR'S THESIS

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Abstract

Do tohoto odstavce bude zapsán výtah (abstrakt) práce v anglickém jazyce.

Abstrakt

Do tohoto odstavce bude zapsán výtah (abstrakt) práce v českém (slovenském) jazyce.

Keywords

Sem budou zapsána jednotlivá klíčová slova v anglickém jazyce, oddělená čárkami.

Klíčová slova

Sem budou zapsána jednotlivá klíčová slova v českém (slovenském) jazyce, oddělená čárkami.

Reference

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Stylized Natural Language Generation in Dialogue Systems

Declaration

I hereby declare that this Bachelor's thesis was prepared as an original work by the author under the supervision of Mr. X The supplementary information was provided by Mr. Y I have listed all the literary sources, publications and other sources, which were used during the preparation of this thesis.

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Ksenia Bolshakova

November 17, 2019

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Chapter 1

Introduction

//TODO Write what is NLP

Chapter 2

Dialogue systems

Dialogue system is a computer system to communicate with a human. Nowadays you meet dialog systems everywhere. A lot of devices have incorporated goal-oriented spoken dialogue systems, such as Yandex's Alisa, Apple's Siri, Microsoft's Cortana, Amazon Alexa, and Google Assistant. Dialogue systems are also used in cars (hands-free car-specific functions, Android Auto, Apple CarPlay, vendor-specific solutions), web (search assistants (IKEA), Facebook Messenger and Telegram chatbots), robots, computer games, research systems (skylar.speech.cs.cmu.edu) etc, because a conversation is a natural way for people to get information.

Basic Dialogue System Types:

- Task-oriented
 - focused on completing a certain task(s)
- Non-task-oriented
 - chitchat
 - gaming the Turing test

Communication Domains:

„Domain“ is a conversation topic or an area of interest

- Single/Closed-domain is one well-defined area
- Multi-domain is joining several single-domain systems
- Open-domain “responds to anything”

Exists several **modes of communication**:

- Text
- Voice
- Multimodal
 - voice/text + graphics
 - additional modalities: video - gestures, mimics; touch

Dialogue initiative:

- system-initiative
 - system asks questions, user must reply in order to progress
 - least natural
 - „form-filling“ („Hello, please enter your e-mail“)
- user-initiative
 - user asks, machine responds („Siri, set the timer for 5 minutes“)
- mixed-initiative
 - system and user both can ask and react to queries
 - most natural

Dialogue system architecture is illustrated in Figure 2.1. This architecture consists from Natural Language Understanding (NLU), dialogue management (DM), and Natural Language Generation (NLG).

NLU extracts the meaning from the user utterance and converts into a structured semantic representation. Natural Language Understanding traditionally consists of domain identification and intent prediction, which are framed as utterance classification problems, and slot filling, framed as a sequence tagging task.

DM plays two roles, tracking the dialogue state and performing the dialogue policy (i.e., telling the agent how to act given the dialogue state.)

NLG transforms structured data into natural language.^[1]

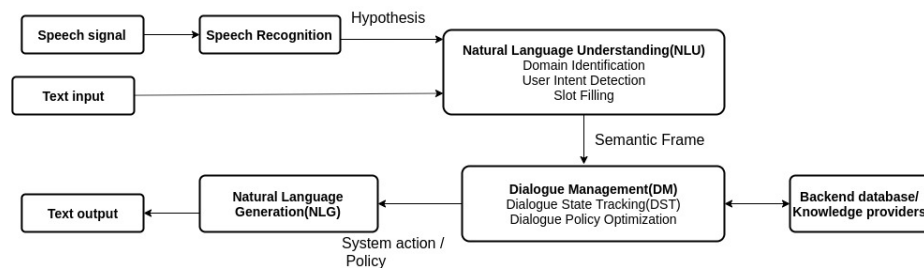


Figure 2.1: Dialogue system architecture.

Chapter 3

Natural Language Generation

Natural Language Generation is a subsection of Natural Language Processing (NLP). NLG approaches can be grouped into two categories, one focuses on generating text using templates or rules (linguistic) methods, the other uses corpus-based statistical methods.

There is one obvious disadvantage in **template-based generation**: the quality of the output depends entirely on the set of templates. Even in a relatively simple domain the number of templates necessary for reasonable quality can become a serious problem.

In **corpus-based generation** it is possible directly mimicking the language of a real domain expert, rather than attempting to model it by rule, but a good corpus is necessary. [\[2\]](#)

Chapter 4

Other

Oh and Rudnicky showed that stochastic generation benefits from two factors:

- it takes advantage of the practical language of a domain expert instead of the developer
- it restates the problem in terms of classification and labeling, where expertise is not required for developing a rule-based generation system

//TODO: more information in article [] //TODO: Info about datasets //TODO: NLP vs Computation linguistic

//TODO: In non task oriented dialogue systems it is very difficult to use template-based generation [2]

Bibliography

- [1] CHEN, Y.-N. and GAO, J. *Open-Domain Neural Dialogue Systems*. [Online; visited 10.11.2019]. Available at: <https://www.aclweb.org/anthology/I17-5003.pdf>.
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