Как перестать бояться и начать решать ConvAI.io

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План

1. Что такое диалоговые системы и зачем они нужны
2. Conversational Intelligence Challenge
3. Baseline: техническая часть
4. Baseline: научная часть

Что такое диалоговые системы

1

1

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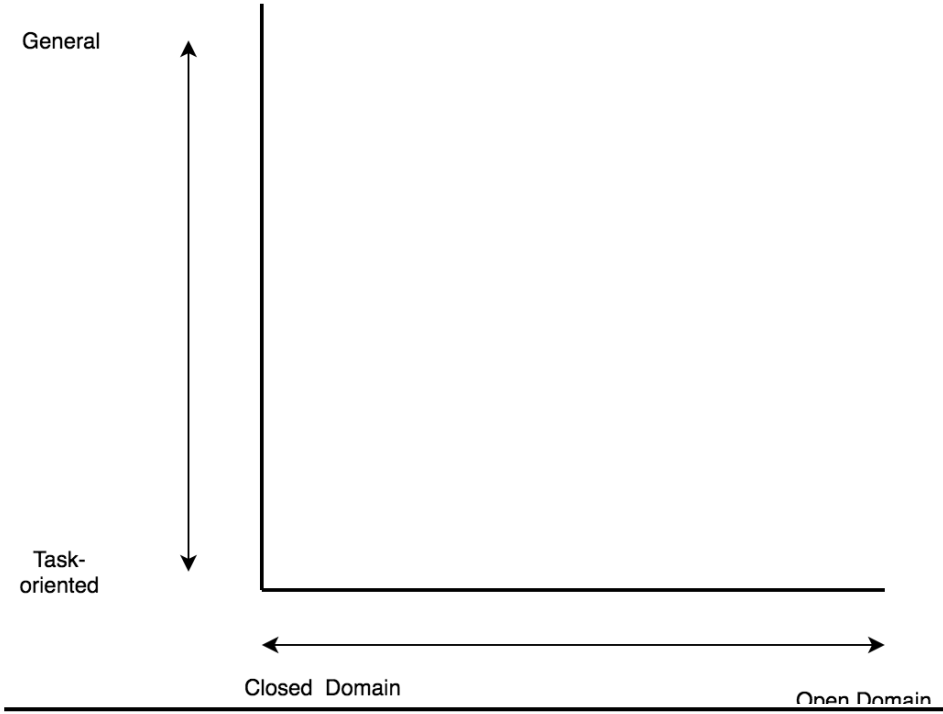

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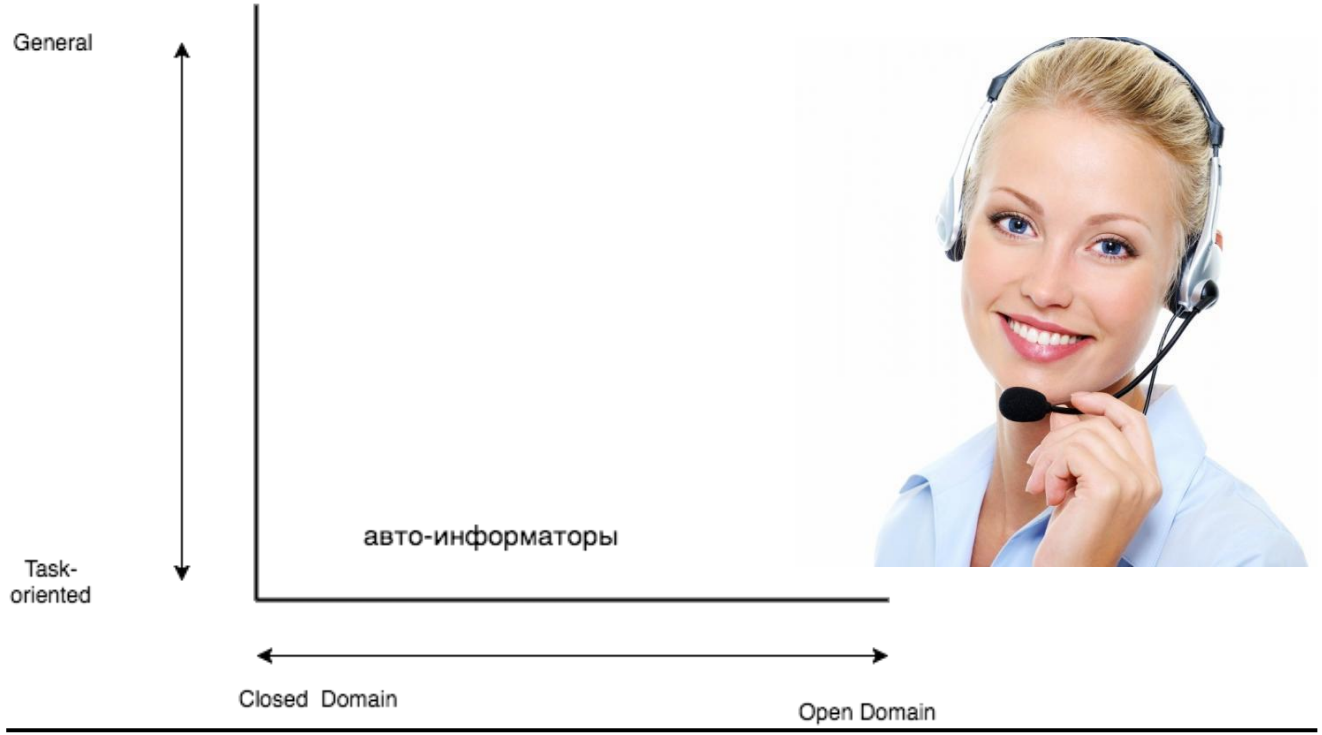

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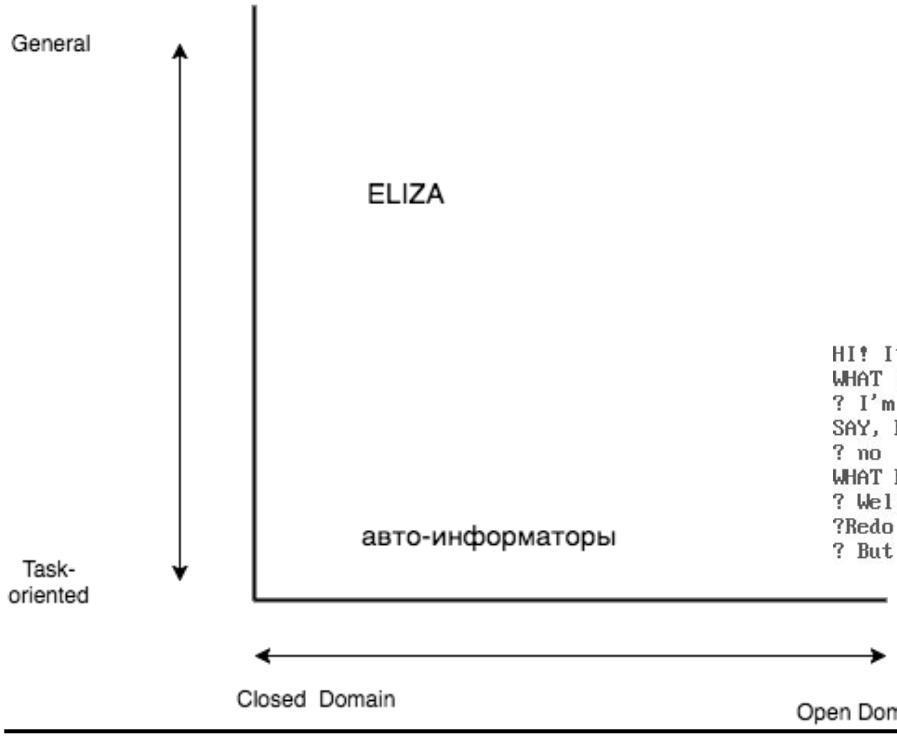


```
**********************************
   THE BROADCASTERS DATABASE
        PRESENTS:

              ELIZA

     BE SURE CAPS LOCK IS ON
       TYPE ! TO TERMINATE
         NO COMMAS PLEASE
   ELIZA TAKES A FEW SECONDS TO
   THINK BEFORE ANSWERING YOU.
   **********************************
```

```
HI! I'M ELIZA THE BROADCAST PSYCHIATRIST,
WHAT IS YOUR PROBLEM?
? I'm at the end of my rope.
SAY, DO YOU WORK IN BROADCASTING?
? no
WHAT DOES THAT SUGGEST TO YOU?
? Well, that I work in some other field.
?Redo from start
? But we've come so far!_
```

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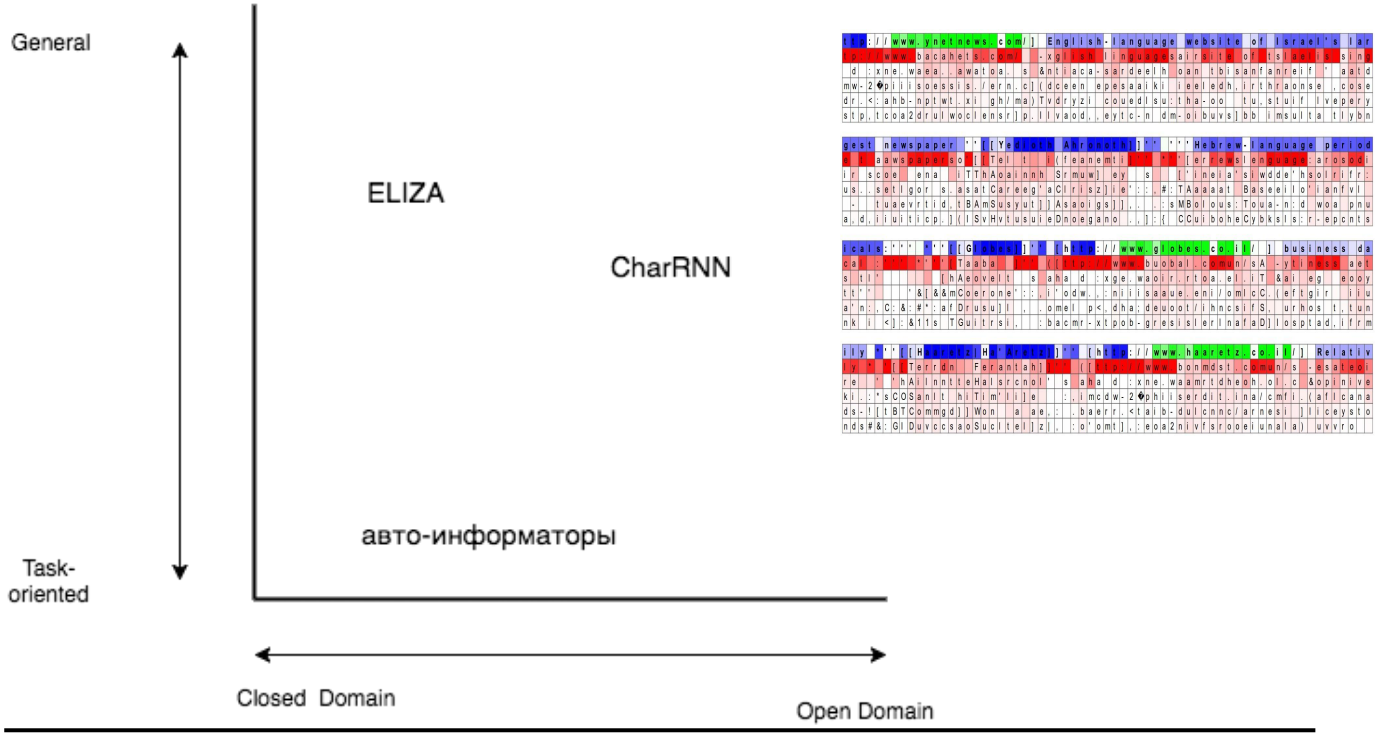

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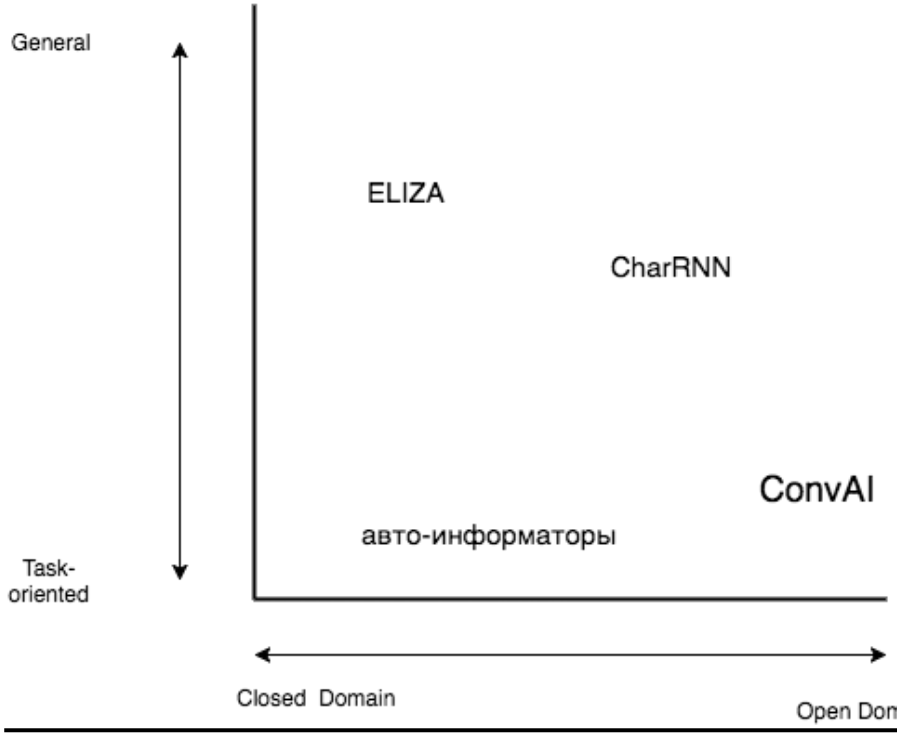

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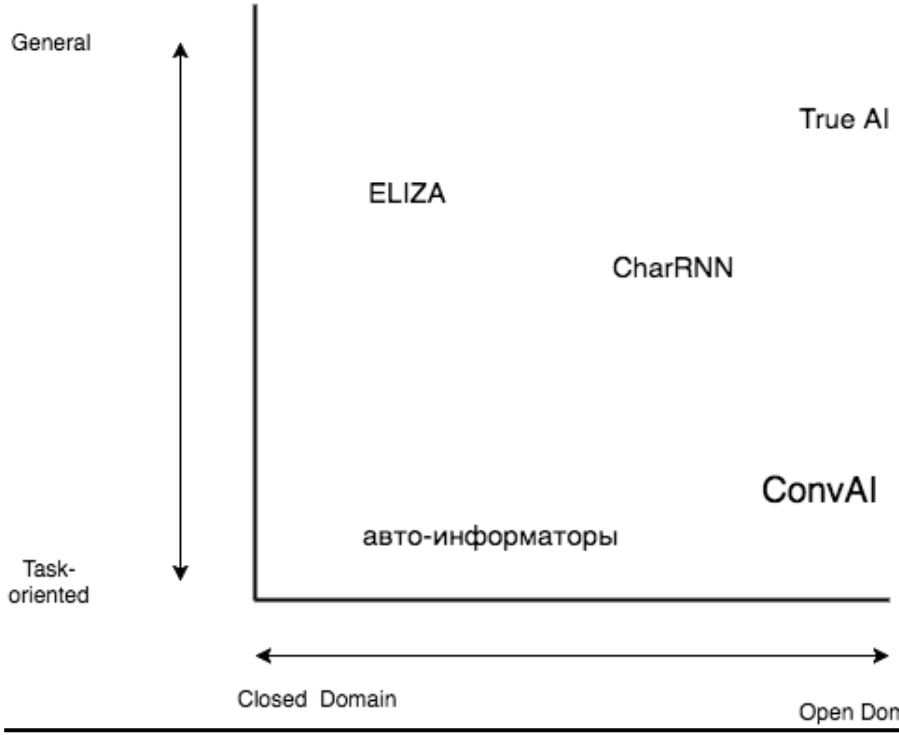

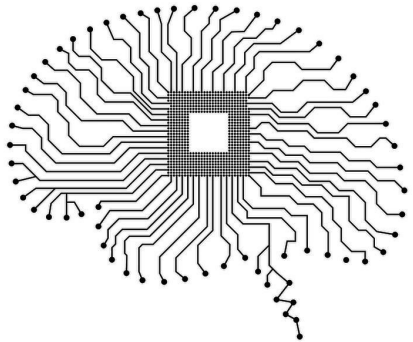

2

Conversational Intelligence Challenge

- Task-oriented
- General

convai.io

2

Conversational Intelligence Challenge

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NIPS 2017 Live Competition

convai.io

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Человек общается с ботом (или не с ботом)

convai.io

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convai.io

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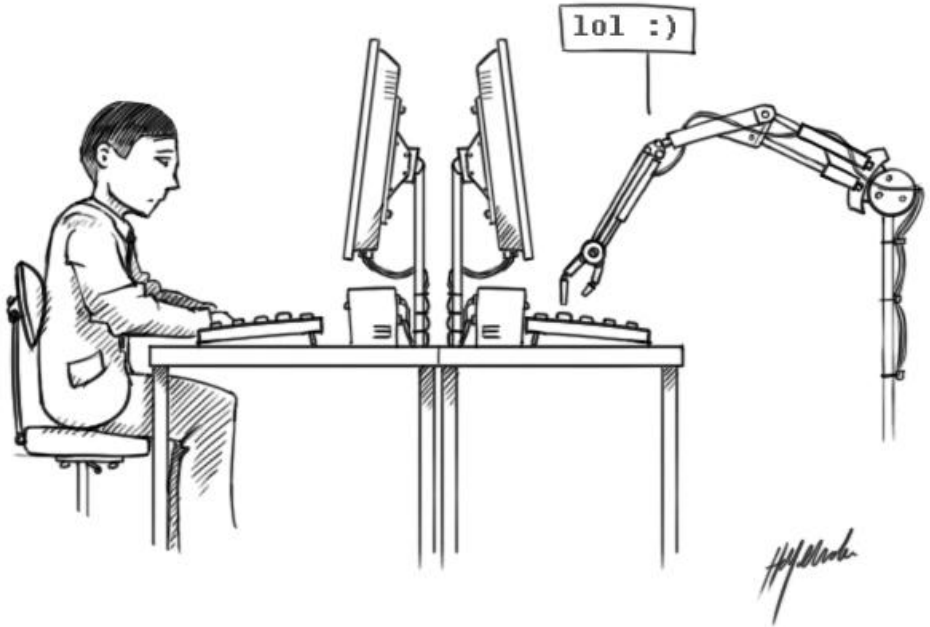
Потом ставят оценки

convai.io

Turing Test

2



Baseline

https://github.com/MIPTDeepLearningLab/ConvAI-baseline

Baseline: техническая часть

3

- Docker
- Python 3
- Tensorflow
- Torch
- Shell
- Regex
- Git

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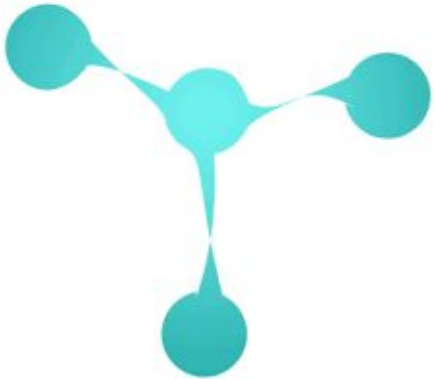

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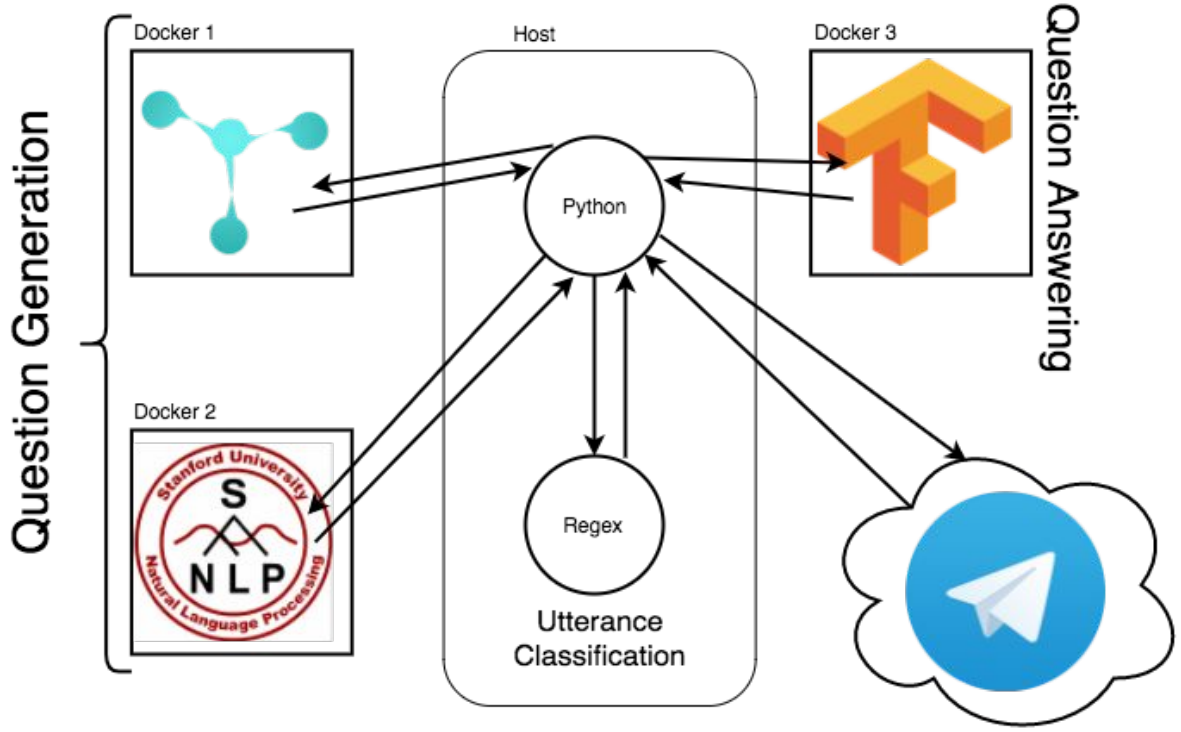


4

Baseline: научная часть

- Question Generation
  - **Neural Question Generation from Text: A Preliminary Study**
  - https://arxiv.org/abs/1704.01792

- Question Answering
  - **Bidirectional Attention Flow for Machine Comprehension**
  - https://arxiv.org/abs/1611.01603

4

Dataset: Description

SQuAD

Stanford Question Answering Dataset

- 500+ Wikipedia articles
- crowdsourced questions
- answers are spans
- 100k+ question-answer pairs

4

Dataset: Example

Architecturally, the school has a Catholic character. Atop the Main Building's gold dome is a golden statue of the Virgin Mary. Immediately in front of the Main Building and facing it, is a copper statue of Christ with arms upraised with the legend "Venite Ad Me Omnes". Next to the Main Building is the Basilica of the Sacred Heart. Immediately behind the basilica is the Grotto, a Marian place of prayer and reflection. It is a replica of the grotto at Lourdes, France where the Virgin Mary reputedly appeared to Saint Bernadette Soubirous in 1858. At the end of the main drive (and in a direct line that connects through 3 statues and the Gold Dome), is a simple, modern stone statue of Mary.

To whom did the Virgin Mary allegedly appear in 1858 in Lourdes France?

Saint Bernadette Soubirous

4

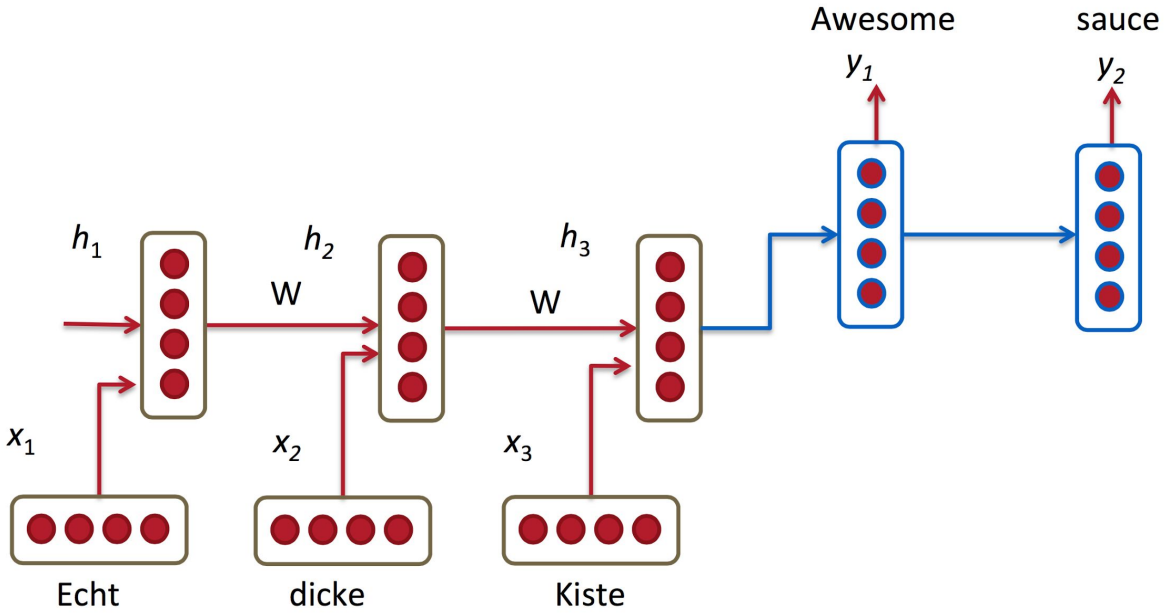
Neural Question Generation from Text: A Preliminary Study

- Пытаемся научиться генерировать вопросы, как в SQuAD

- Encoder-Decoder architecture
- Answer position feature (BIO markup)
- Lexical Features - NER, PoS-tagging
- Attention-based Decoder

4

Encoder-Decoder



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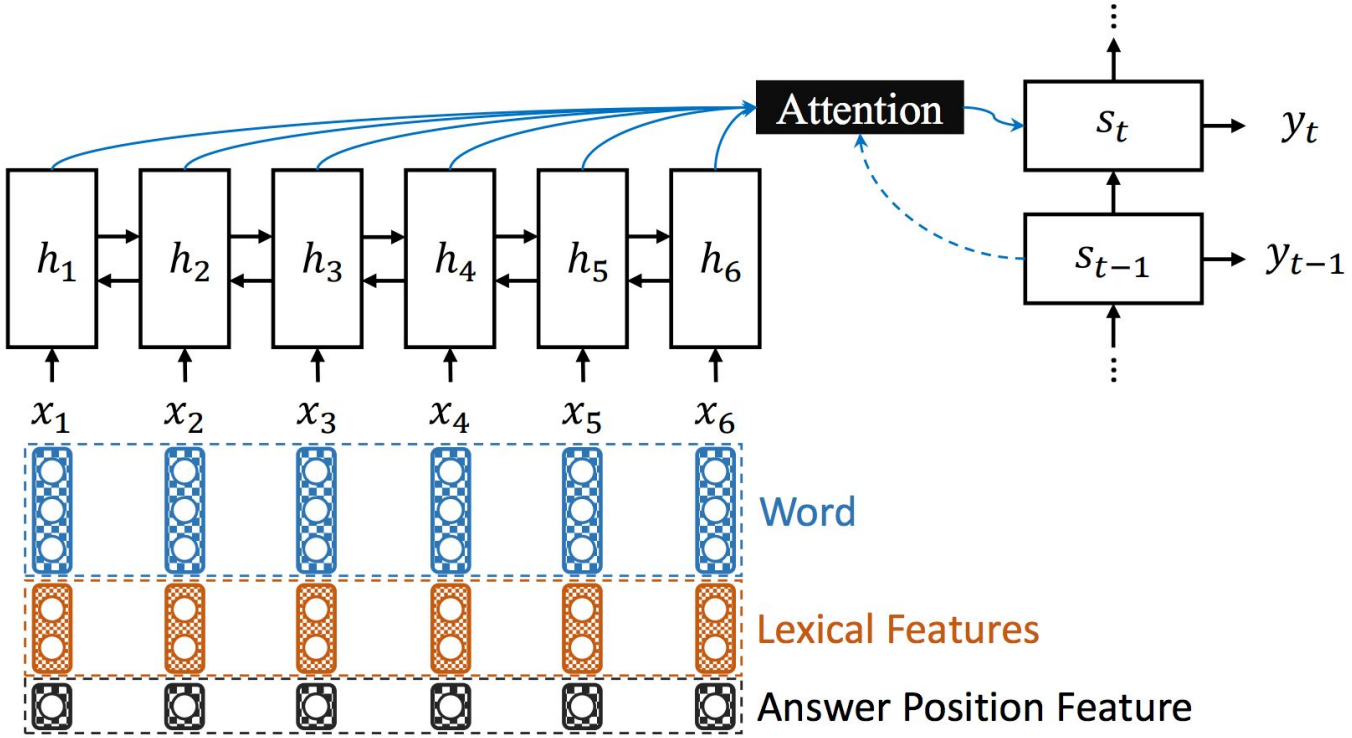

Attention
s_t
y_t
s_{t-1}
y_{t-1}
h_1
h_2
h_3
h_4
h_5
h_6
x_1
x_2
x_3
x_4
x_5
x_6
Word
Lexical Features
Answer Position Feature

4

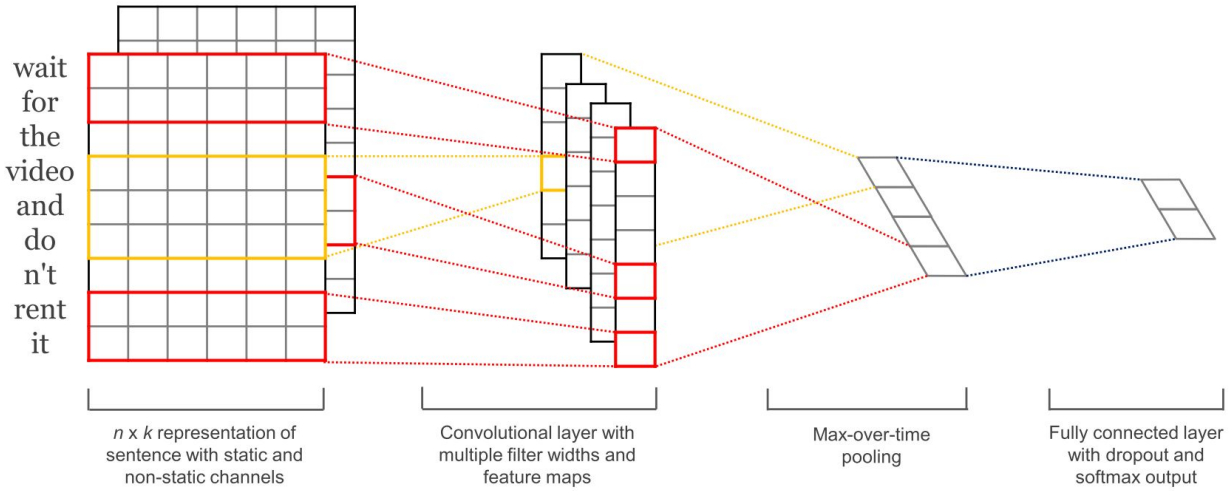
Bidirectional Attention Flow for Machine Comprehension

- Генерируем ответы в виде span на основе текста и вопроса к нему

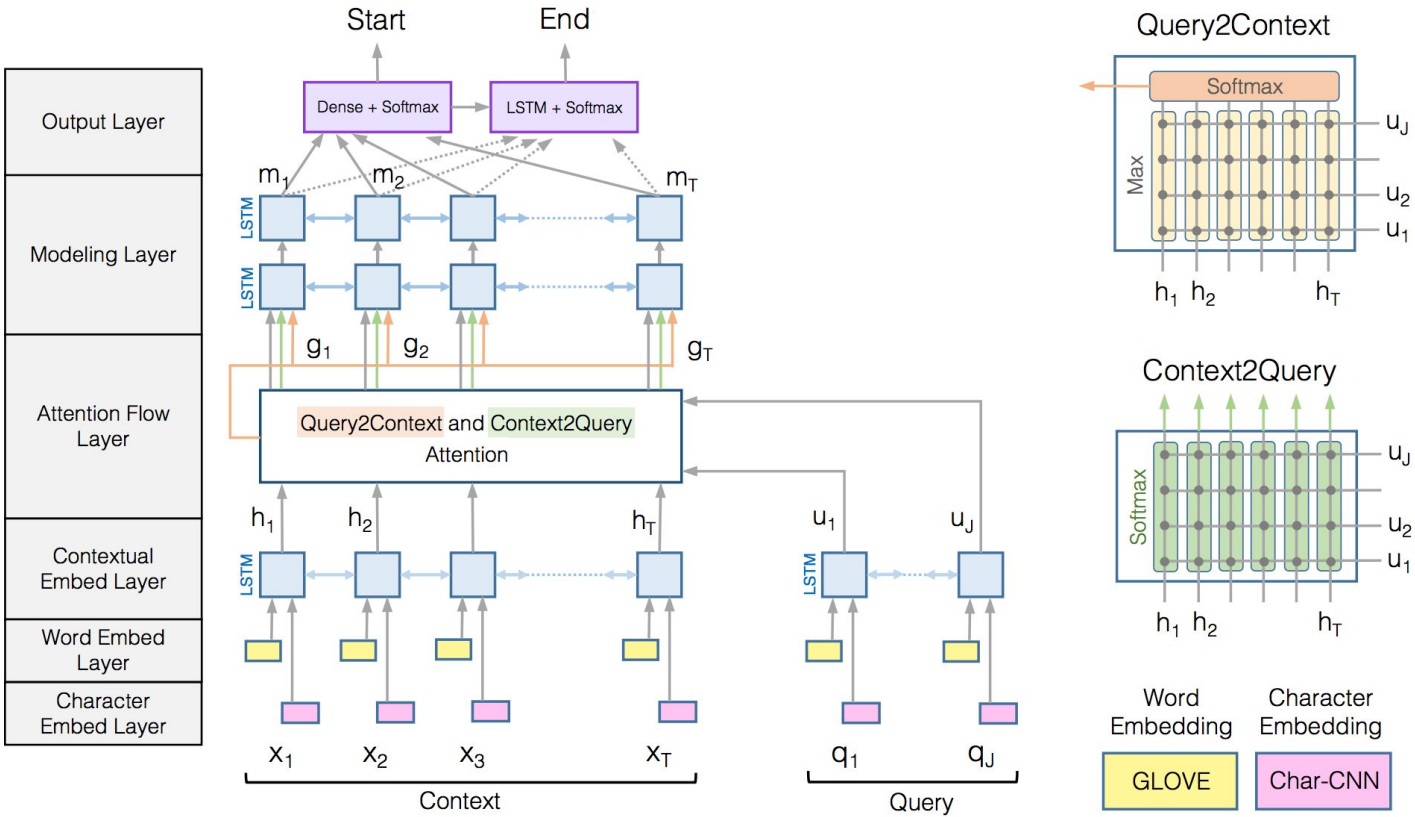
- Character & Word Embedding
- Context Embedding
- Attention Flow
- Modelling Layer

Character Embedding

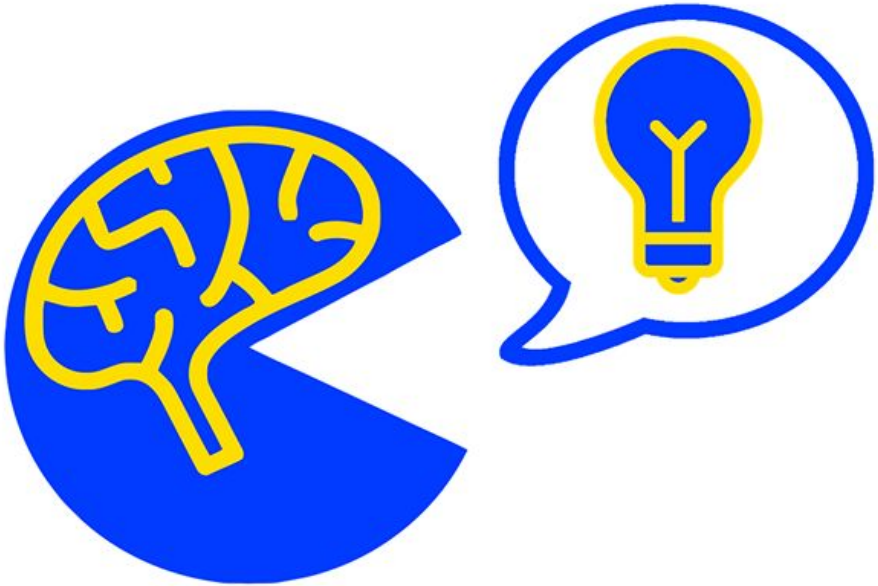
4



4


Output Layer
Modeling Layer
Attention Flow Layer
Contextual Embed Layer
Word Embed Layer
Character Embed Layer
Start
End
Dense + Softmax
LSTM + Softmax
LSTM
Query2Context and Context2Query Attention
Context
Query
Query2Context
Softmax
Max
Context2Query
Word Embedding
Character Embedding
GLOVE
Char-CNN

Спасибо за внимание!



1

Что такое диалоговые системы (2)

- State Tracker
- Natural Language Understanding
- Natural Language Generation

Baseline: техническая часть

3

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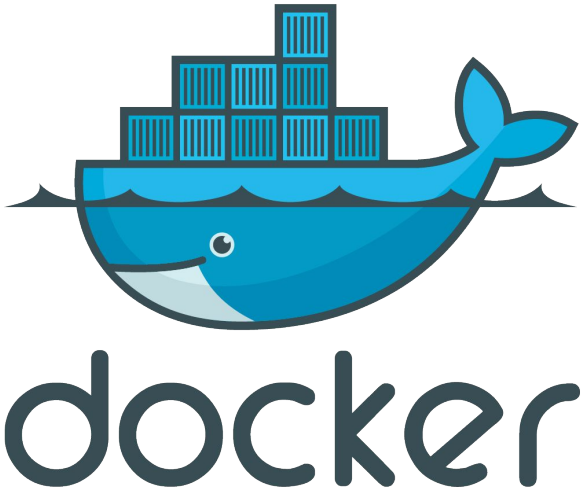
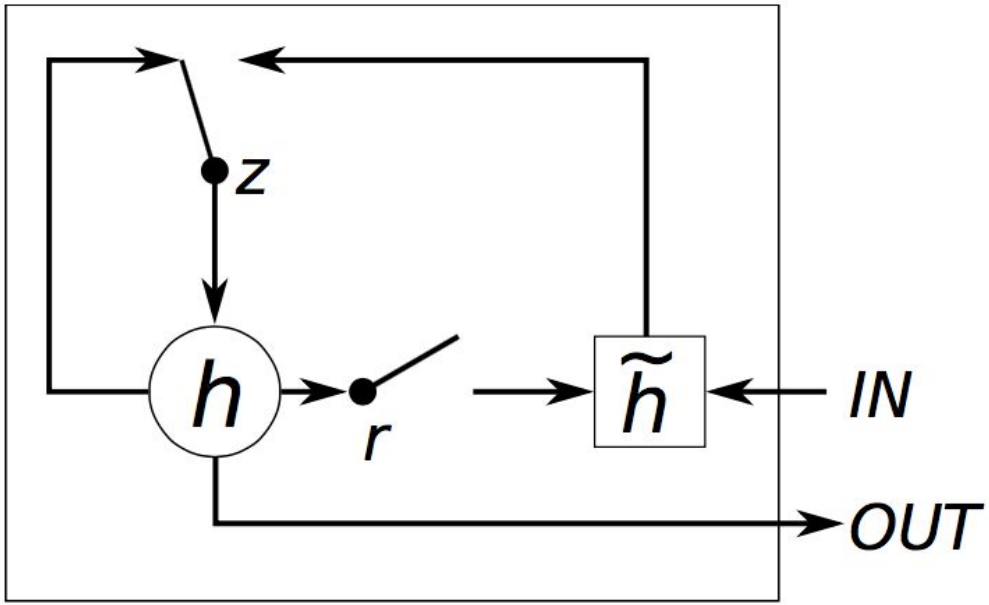
- Python 3
- Tensorflow
- Torch
- Shell
- Regex
- Git



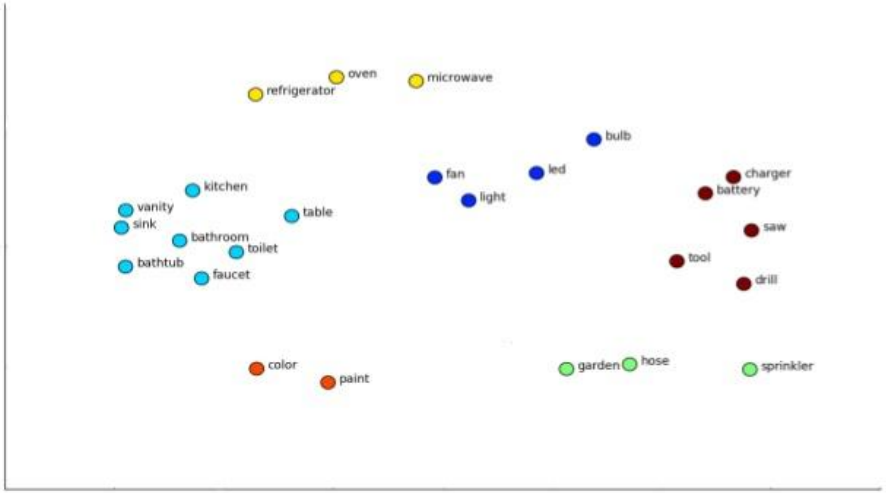
Gated Recurrent Unit (GRU)

4



Word Embedding

4

Word vectors

- **Example:**