



Politician: An Imitation Game

David Kuboň¹, Eleni Metheniti², Barbora Hladká¹

¹Charles University, Prague, Czech Republic,
{*dkubon,hladka*}@mff.cuni.cz,

²Saarland University & DFKI, Saarbrücken, Germany,
elenim@coli.uni-saarland.de

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Overview

Previous Work

Methods

- Conversational Topic

- High-Level Concept

- Reply Generation

- Non-political Scenarios

Evaluation

- Testing the Politician

Evaluation

- Language Comparison



Introduction

- ▶ Chatbots: conversation agents responding to a human's questions in written/oral form
- ▶ Weizenbaum (1966): ELIZA – first chatbot
- ▶ How do chatbots talk?
Rules, heuristics, AI methods, deep-learning
- ▶ *Politician*: rule-based conversational agent that imitates a politician.
- ▶ Treex: highly modular NLP software suite in Perl



Our research questions

- ▶ Goal: create a conversational agent that is **engaging and entertaining**
- ▶ Can a rule-based chatbot with **simple NLP tools** and **no knowledge base** be successful?



Previous Work

- ▶ Chatbots:
 - ▷ Rule-based: ELIZA, PARRY
 - ▷ Markup schema: A.L.I.C.E., OntBot
 - ▷ Combinations: Twyla
- ▶ NLP methods: QA, parsing, NER, word vectors, sentiment analysis
- ▶ Politician chatbots: few examples



Conversational Topic

- ▶ Politicians engage socially with people, give short and precise answers, avoid answering some topics, can talk to different people
- ▶ Can our chatbot mimic this behavior successfully?



High-Level Concept

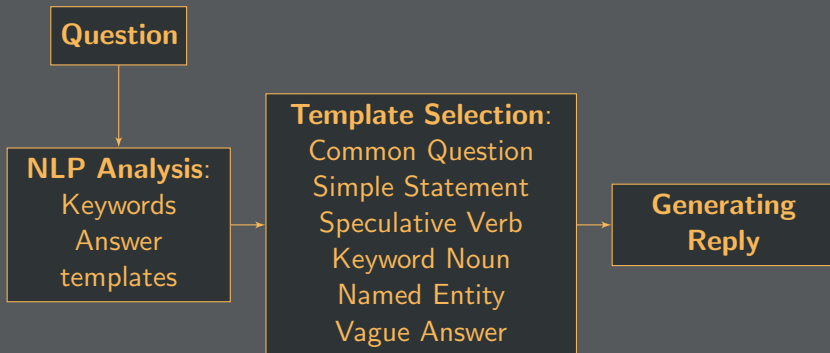
- ▶ Czech version: Humphrey Novotný
English version: Humphrey Smith
- ▶ Initialize: open with a greeting and ask for input

```
### Started, doing setup ###  
Humphrey: Greetings. What would you like to discuss about?  
> █
```

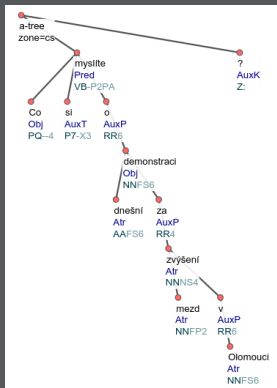
- ▶ Treex: highly modular NLP framework written in Perl
- ▶ Used: morphosyntactic parser MorphoDiTa, lemmatizer, NER for both languages



High-Level Concept



Reply Generation



Co si myslíte o dnešní demonstraci za zvýšení mezd v Olomouci?

(= What do you think about today's demonstration for salary increase in Olomouc?)

Tagged words:

NN: *demonstration, increase, salary, Olomouc*

VB: *think*



Reply Generation

- ▶ Generic word list (*how, be, you*): return generic answer
- ▶ Speculative verbs: answer with a speculative verb, e.g. *think, believe*
- ▶ Only knowledge base: keyword list
- ▶ Keyword list: 325 words, e.g. *unemployment, war*
Nouns are checked in the keyword list → added in the answer
- ▶ Named Entity Recognition
- ▶ If all methods fail → vague answer from list
- ▶ Plus: if user keeps repeating keyword → angry prompt



Reply Generation

- ▶ Answer template: if words with different morphology:
 - ▷ *[keyword] [být] [plod] našeho mnohaletého úsilí*
(= [keyword] [to be] [fruit] of our longterm efforts) ⇒
 - ▷ *Reformy jsou plody našeho mnohaletého úsilí.*
(= Reforms are the fruits of our longterm efforts.)
- ▶ Livelier conversations, engaging to the user



Sample Conversations

(translated from Czech)

(P): Hello! What are you interested in?

(U): Good afternoon. How much is the Czech state *debt* per capita?

(P): This is a very good question. We have already voted to create a special committee that will deal with the *debt*. Let us wait for its conclusion.

(U): What impact will *inflation* have on Czech market?

(P): This topic will be emphasized in the next election campaign.

(U): What is your opinion on amnesty granted by President *Václav Klaus*?

(P): I do not like this person at all.

(U): Do not you think that *MPs' salaries* are too high?

(P): Unfortunately, judging this topic is not within my competence. I am sorry, but I have to go now, I have an important meeting.



Sample Conversations

Humphrey: Greetings. What would you like to discuss about?

> Did you read about the Paradise papers?

Humphrey: This topic has been and will be the subject of many discussions, and we are preparing a proposal for the next parliament session. Therefore I cannot tell you any details at this moment.

> Are you in the list?

Humphrey: I will refrain from commenting on this subject.

> Is anyone you know of in the list?

Humphrey: That is a very good question. Next question, please.

> Is Trump in the list?

Humphrey: You ask about things that are highly confidential. You cannot be surprised that I am not going to answer.

> Is Trump guilty?

Humphrey: I would prefer to refrain from commenting on this topic, for the time being.



Non-Political Scenarios

- ▶ *Football player*: previous version, was not as successful
- ▶ Keywords about politics are most successful
- ▶ Potential for QA systems



Testing the *Politician*

- ▶ Conversations with human via terminal
- ▶ Random spelling errors by *Politician*
- ▶ 30 conversations, 33% users were fooled by the conversation
- ▶ 140 annotated answers on their quality:

	A	B	C	D	E	F	G	H	Avg.	Perc.
Fitting	17	48	34	18	61	33	63	69	42.9	30.6
Not fitting	71	59	35	56	24	44	48	48	48.1	34.4
Nonsense	52	33	71	66	55	63	29	23	49.0	35.0



Language Comparison

- ▶ Czech: morphologically rich language vs English: morphologically poor language
- ▶ More tools required in Czech, but more variety
- ▶ Reply patterns matter
- ▶ Czech users were more impressed by the chatbot's capability to produce grammatically correct utterances



Conclusion

- ▶ Simple chatbot for a conversation
- ▶ Simple rule-based system with a closed domain
- ▶ Can a rule-based system compete with modern AI systems?
What other NLP tools can be implemented? How can it be
utilized and by whom?



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Humphrey: Greetings. What are you interested in?  
> Can you please tell me what's the meaning of life, Humphrey?  
Humphrey: 42.
```

The End