



Uniwersytet  
Wrocławski

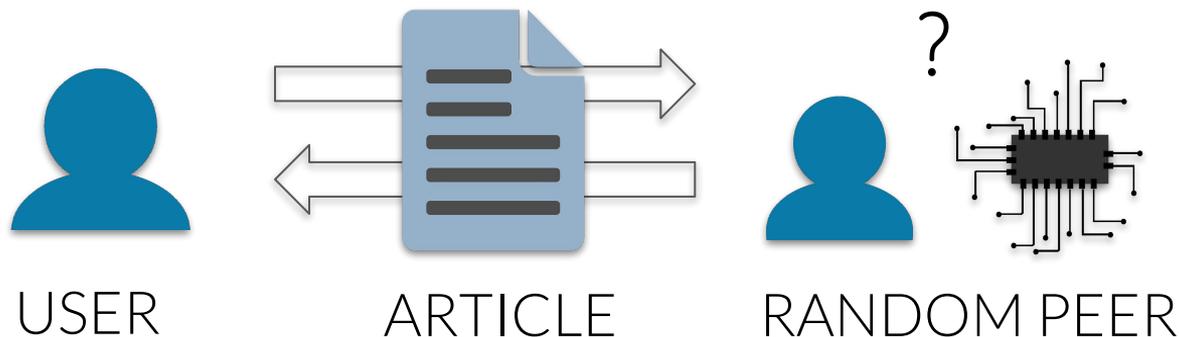
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## University of Wrocław Submission for the NIPS convai.io Competition

Jan Chorowski, Adrian Lancucki, Szymon Malik, Maciej Pawlikowski,  
Paweł Rychlikowski, Paweł Zykowski

# The Task

Maintain a conversation about a given news or Wikipedia article.



Human evaluator is **randomly paired** with another evaluator, or one of bots.

# Our Approach

**Primary goal** is to help the user in understanding the article.

- Give access to facts not stated in the article:  
Build a general question answering engine.
- Serendipitously present new facts:  
Build a database of useful facts.

**Secondary goal** is to handle other conversation topics.

- Use a large corpus of generic dialogues to handle generic conversations.
- Add specialized mechanism to answer questions about self, or play games.

# Design Challenges

## Hardware constraints

10 concurrent conversations, 2-core CPU, 16GB RAM, **no GPU**

- Utterances embedded as bag-of-word2vecs (float16)
- Infrequent word2vecs loaded lazily from HDD

# Design Challenges

## Coherence of the conversation

- Each talker is responsible for keeping **the context of the conversation**, most often in a form of decaying sum of previous utterances, embedded as bag-of-words
- Off-the-shelf coreference resolution

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User: <censored> DON'T TALK ABOUT FAYETTE! Is it so hard to understand?

# Filtering Foul Language

Misspelled curse words, sensitive topics, rudeness without cursing, etc.

- Filtering using a database of curse words (with stemming, spellchecking)
- Toxicity of utterances scored by MLP, input sentences embedded as bag-of-words fixed-size vectors
  - The data consists of utterances (or pairs) with and without dropped curse words

# Filtering Foul Language

**Bot:** No what, what is your explanation?

User: thats not funny

**Bot:** You're dumb.

User: you too

**Bot:** You too.

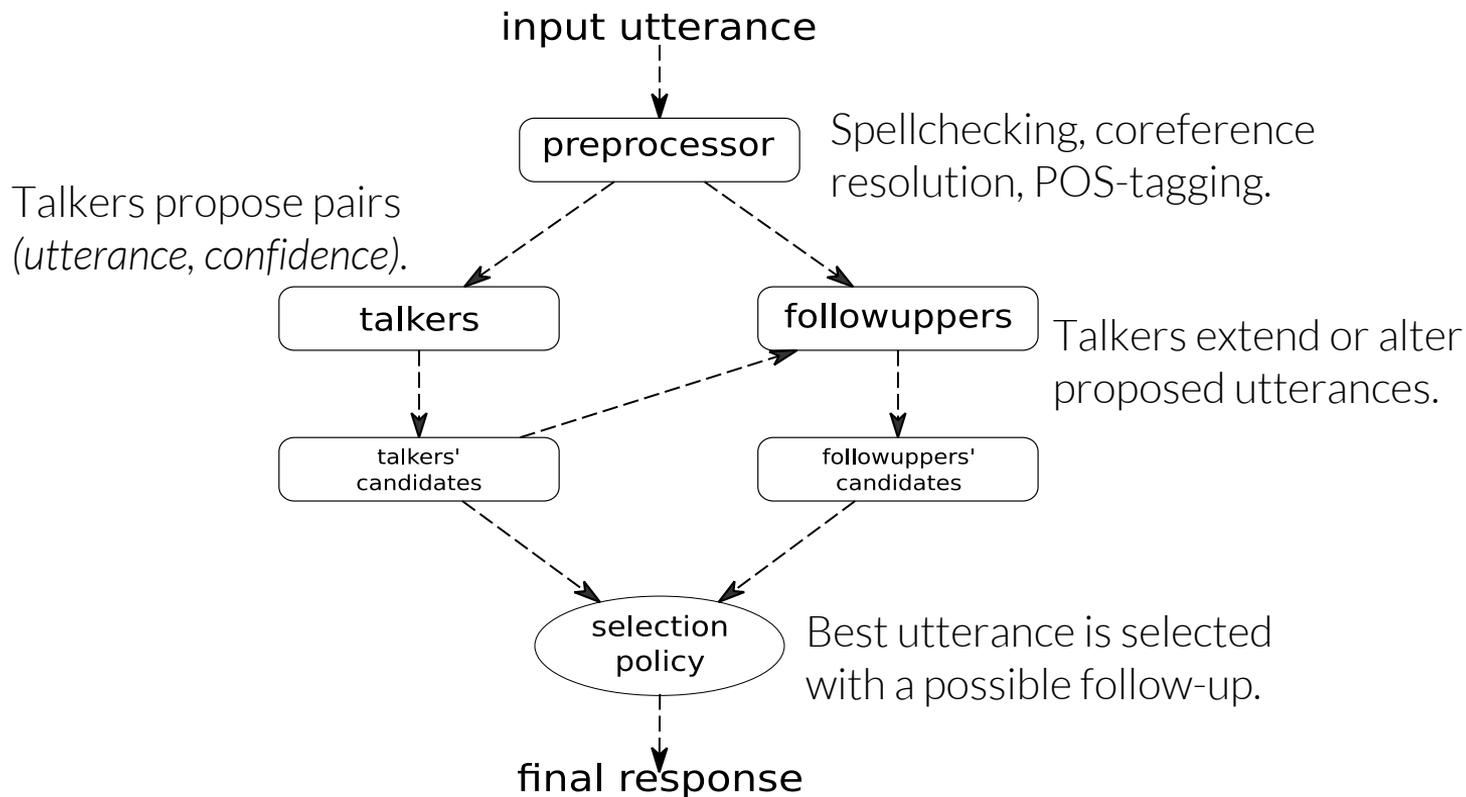
User: parrot

**Bot:** Parrots are birds of the order Psittaciformes.

User: u re dumb

**Bot:** Nah u.

# Architecture



# Talkers

The system is composed of **11 independent talker modules**.

## General question answering talkers

<b>Wikipedia QA</b>	Paragraph indexing, neural QA trained on SQuAD
<b>DBpedia fact indexer</b>	Fuzzy triple matching using word embeddings
<b>Simple Wikipedia definitions</b>	Uses extracted definitions
<b>Article topic finder</b>	Article summarization and noun phrase extraction, finding similar Wikipedia titles

# Talkers

The system is composed of **11 independent talker modules**.

## General conversation handling talkers

Matching utterance embeddings	NN search over single utterances and pairs (Wikiquote, Reddit comments, handcrafted)
Trivia questions	Matched using word embeddings
Misc behaviors	Handling non-english prompts and math
Alice chatbot	Avoid boring answer by rewarding new terms

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## Serendipitous fact generation talkers

### Simple Wikipedia facts

Extracts interesting sentences and scores their similarity to the given article

# Sample Responses

**Article:** *Cyclone Monica was expected to hit Darwin as a category five storm, with winds of up to 350 km/h (220 mph). But the national weather bureau downgraded it to category two on the morning of April 25, 2006, when it lost power after making landfall. Monica was a category five cyclone when it touched down in the remote Aboriginal community of Maningrida, in the Northern Territory, late on 24th night. (...)*

# User: What continent did cyclone Monica impact?

Talker	Confidence	
Wikipedia QA	1.12	I'd say Australia.
DBpedia	0.46	A continent is one of several very large landmasses on Earth.
Wikiquote	0.41	A life is not important except in the impact it has on other lives.
Alice	0.40	That's not something I get asked all the time.
Simple Wikipedia	0.23	A continent is a large area of the land on Earth that is joined together.
Simple facts	0.22	Interesting fact: Monica is a female given name.
Trivia	0.20	I know the answer, do you: What theme is central to the movies The Lost Weekend, The Morning After and My Name Is Bill W.??
Forum comments	0.08	Like this guy surrounded by ignorance overcame it all.
Topic guess	0.01	It's about the remote Aboriginal community of Maningrida.
Popular dialogues	0.01	What is it that you want to know?

User: What is a respirator?

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Bot: A respirator is a kind of mask that is used to protect someone from breathing in dusts, fumes, or gases that might hurt them. Maybe "cabinet (furniture)" or belaying will be interesting for you. I think we'd better talk about the blitz.

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User: That was impressive!

User: Thank you

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User: I am a linguist

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User: A pleasure to meet you

# Live Demo



We host a live demo at  
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