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Dialogue Systems
at
Charles University

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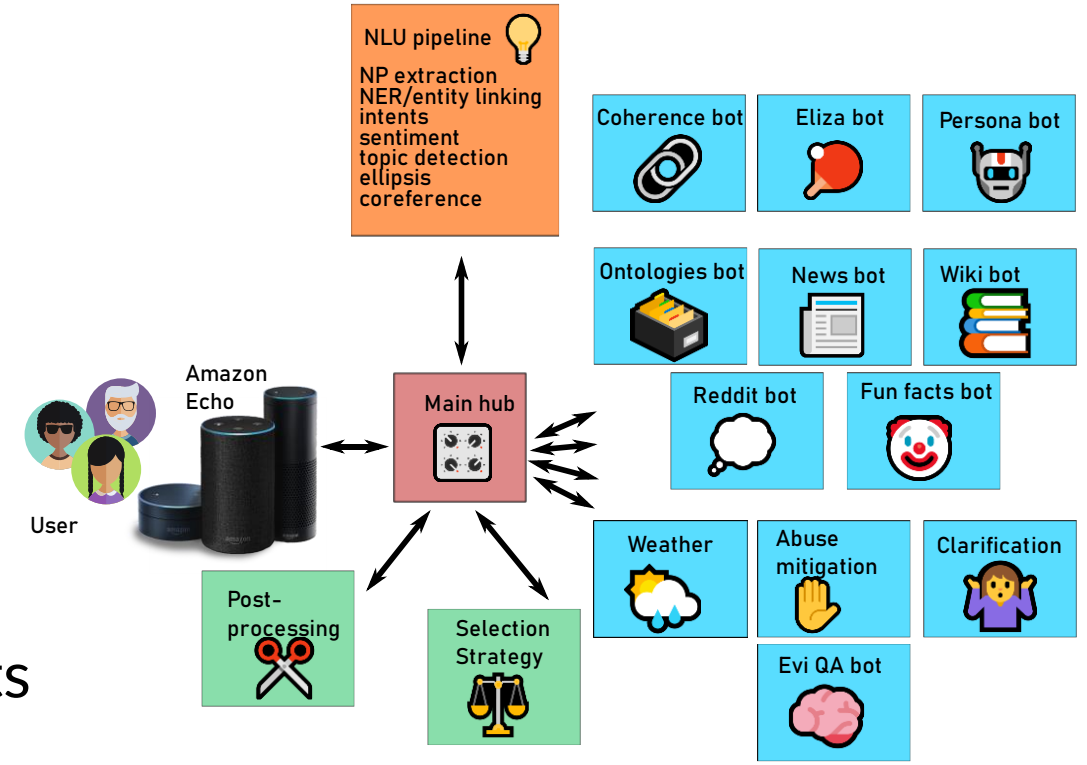
Who we are

- Small group (1PI + 3PhD students)
  - +related MSc projects
  - (re-)established 2019
- within a large 70+ people NLP group at Charles Uni (ÚFAL)
  - machine translation, morphology, parsing, IR, digital humanities…
- working on dialogue systems/chatbots + language generation
- focus on machine learning & deep learning
- 2 dialogue systems courses
  - intro (BSc.) – running now
  - advanced (MSc.) – deep learning, winter

Papaioannou et al., ConvAI 2017 [ArXiv 1712.07558]

Lessons from Alexa Prize (2017-2018)

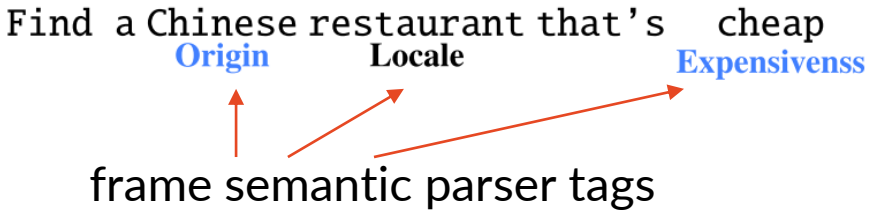
- chitchat chatbot competition – engaging 20-minute dialogue
- too much machine learning hurts:
  - offensive speech – not just swearing
    - *"I already have a woman to sleep with"*
  - inappropriate advice
    - *U: "how to dispose of a dead body?"*
      S: "with some fava beans"
  - dullness – *"I don't know"*
- solution: hybrid/ensemble
  - many sub-bots, replies filtered & ranked
  - some rule-based, some IR, no neural nets

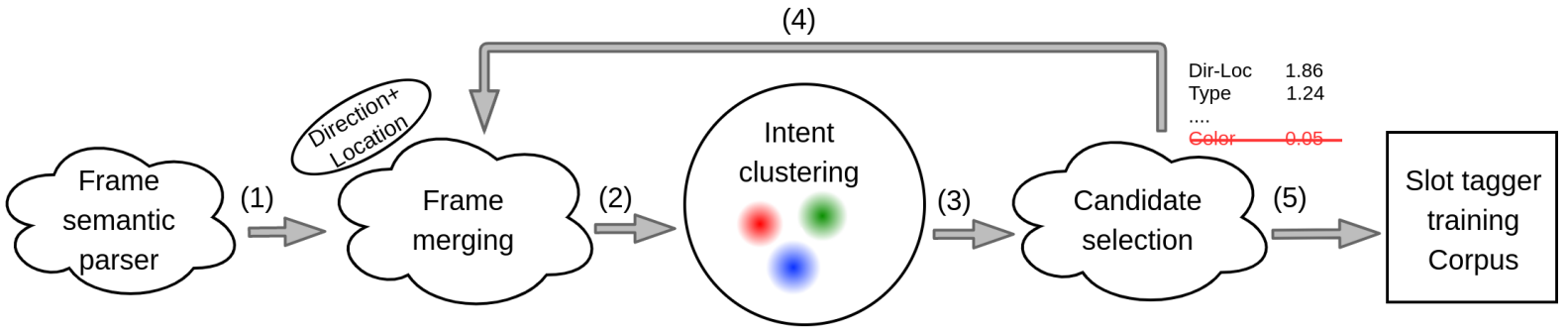


Hudeček et al., under submission

Our NLU Experiments

- getting NLU without labelled data
- using existing parsers
  - frame semantics – fine-grained labels
- clustering & pruning the results
  - similar labels form the same slot
  - irrelevant labels are removed
- promising, but not practical yet





Dušek et al., 2019a,b [arXiv:1911.03905, arXiv: 1910.05298]

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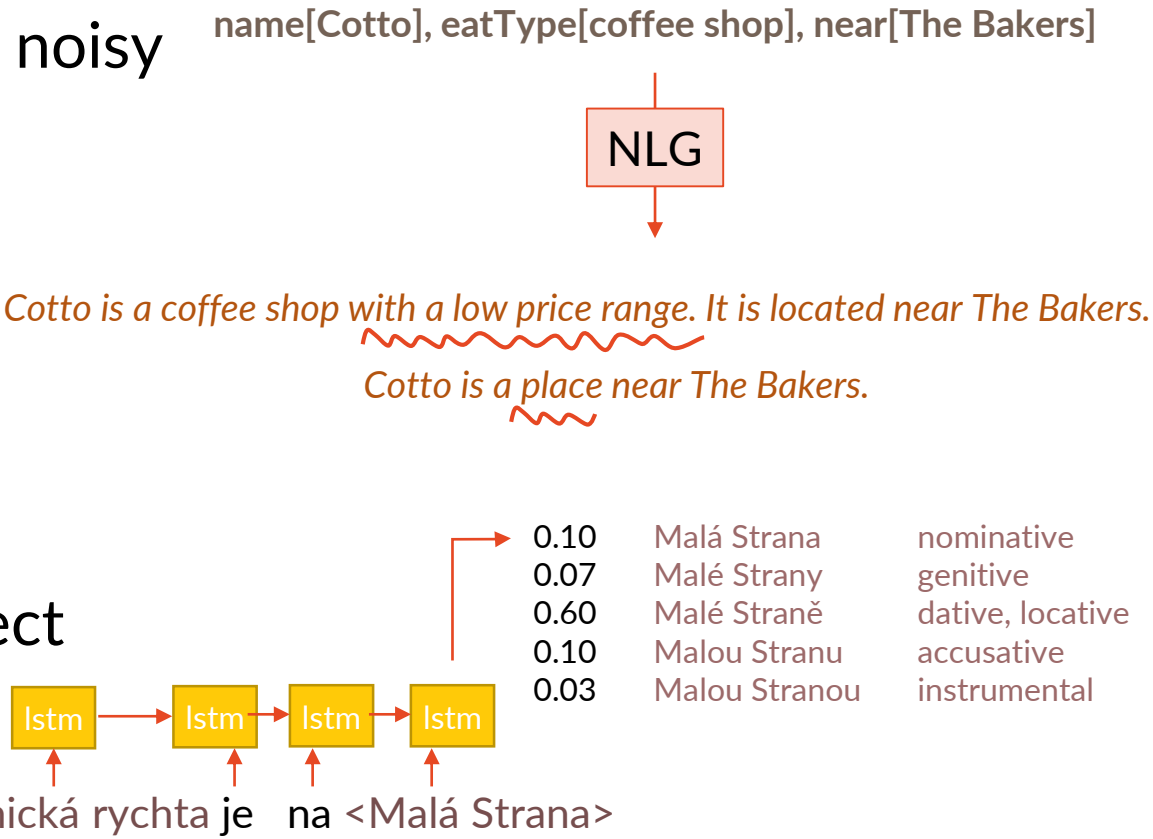
Our NLG Experiments

- all with neural generation models
  - word-by-word generation, conditioned on meaning
- cleaning training data
  - crowdsourced data is (most probably) noisy
  - neural generators are prone to errors
  - cleaning the data helps more than fancy neural architectures
    - 97% error reduction
- Czech NLG
  - inflection needed
  - neural methods work, but aren't perfect



Academia Problems

- current research topics:
  - end-to-end neural nets for dialogue
  - large pretrained neural models for NLU (BERT etc.)
  - fully data-driven dialogue management
  - fully data-driven language generation
- stress on fancy neural models
- all of it needs lots of data & compute to run
- bit of a disconnect with practical use
  - but practical ≠ publishable 😐
- hopefully it'll get practical eventually

Practically useful stuff?

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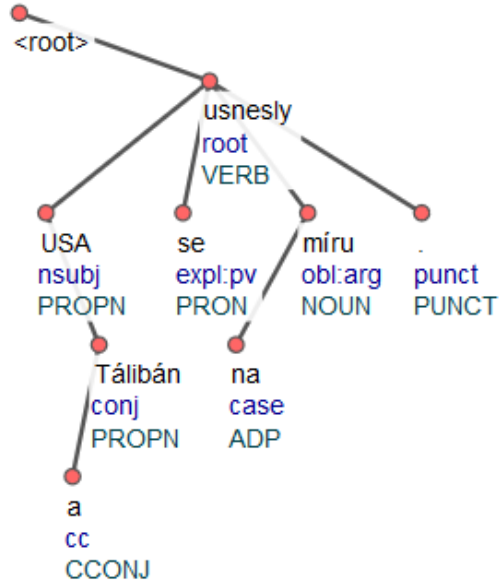
- ÚFAL has a lot of NLP tools
  - especially for Czech
  - mostly for written language
- **Korektor**
  - statistical spellchecker
- **Morphodita**
  - morphology: parts-of-speech, base word forms
- **UDPipe**
  - syntax: find subject/object/predicate etc.
- **NameTag**
  - find named entities in text

USA a Taliban se usnesly na míru.

Original
miru
Suggestions
míru
miru

Token	Lemma	Tag
USA	USA	NNIPX-----A---8
a	a-1	J^----------
Tálibán	Tálibán	NNIS1-----A----
se	se	P7-X4----------
usnesly	usnést	VpTP---XR-AA---
na	na-1	RR--4----------
míru	míra	NNFS4-----A----
.	.	Z:----------



USA a **Tálibán** se usnesly na míru.

gc - States
g - Geographical names

Thanks

- Contact me: odusek@ufal.mff.cuni.cz
- Have a look at our web:
  - department: http://ufal.cz
  - me: http://ufal.cz/ondrej-dusek
- Have a look at our tools:
  - tools main: https://lindat.cz/#tools
  - spellcheck: http://ufal.cz/korektor
  - morphology: http://ufal.cz/morphodita
  - parsing: http://ufal.cz/udpipe
  - entities: http://ufal.cz/nametag