ELITR, Bergamot

Our Participation

Ondřej Bojar; Dec 12, 2022

Outline

Two EU H2020 RIA projects (2019–2021 + a few months):

Targetting 40+ languages in simultaneous speech translation

ELITR **Multilingual Speech Translation** **Minuting**

High-quality MT on consumer CPU

Bergamot **Privacy** **Trust in Communication**

- Some remarks on project coordination.

H2020 RIA ELITR (2019–2021 +3 months)

EU research and innovation project ELITR aims:

- Highly multi-lingual machine and speech translation.
- Document-level machine translation.
- Automatic meeting summarization, “Minuting”.

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. . . and the Supreme Audit Office of the Czech Republic as affiliated user partner.

Main ELITR event: Interpreting at EUROSAI Congress (Prague, May 2021).

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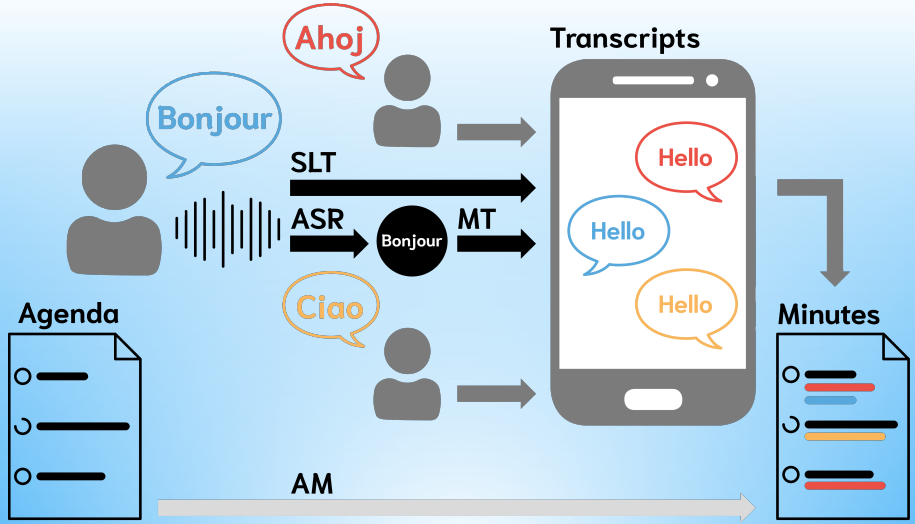
ELITR Technologies: ASR, MT, SLT, Minuting



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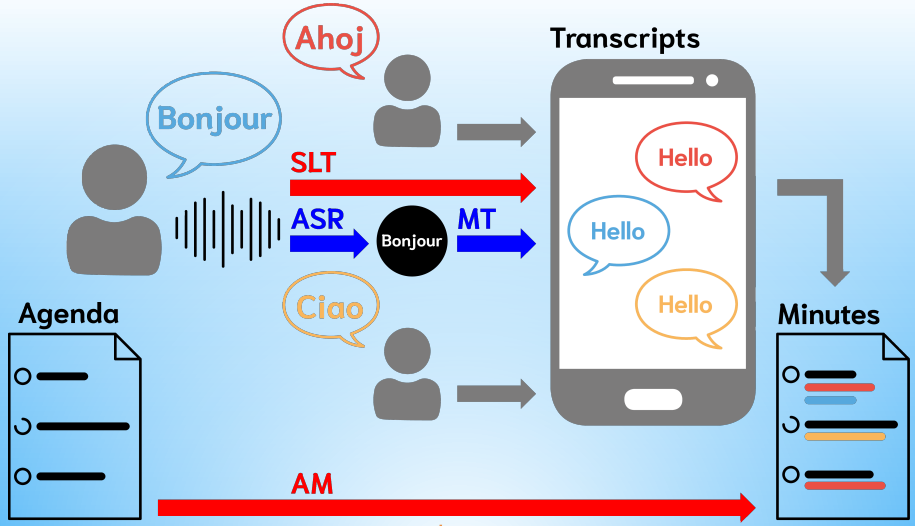


Speech Translation at Conferences

Image source: https://ec.europa.eu/education/knowledge-centre-interpretation/conference-interpreting/conference-interpreting-explained_en

ELITR Languages

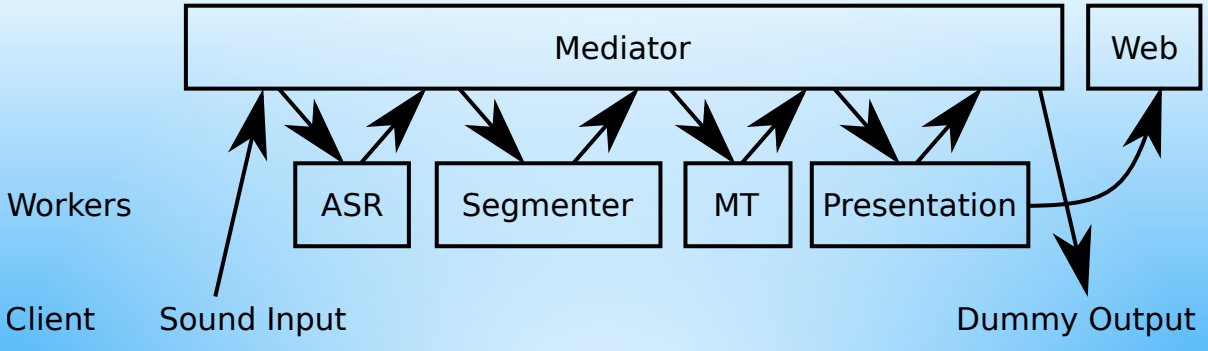
Languages to be supported by the ELITR project:

Technology	**Primary Focus**	**Covered**	**Experimental**
ASR	En, De	Fr, Sp, It, Ru	Cs
SLT & MT	{ En, De }	all EU languages	all EUROSAI langs
	→ { En, De, Cs }	→ all EU languages	→ all EUROSAI langs
Summarization	English, Czech	–	–

24 EU languages: Bulgarian, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Irish, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Romanian, Slovak, Slovene, Spanish, and Swedish.
Further 19 EUROSAI languages: Albanian, Arabic, Armenian, Azerbaijani, Belorussian, Bosnian, Georgian, Hebrew, Icelandic, Kazakh, Luxembourgish, Macedonian, Moldovan, Montenegrin, Norwegian, Russian, Serbian, Turkish, and Ukrainian.

Overall ELITR Architecture

- Components can run distributed, connected via "bi-sockets".



- Many challenges along the pipeline, see my invited talk at WMT:
  `http://ufallab.ms.mff.cuni.cz/~bojar/wmt22-invited`

Multi-Target and Multi-Source MT

- Multi-Target focus: Efficiency
  - Decrease hardware resources compared using many separate models.
- Multi-Source focus: Resolving ambiguity thanks to existing translations.
  - E.g. Translating German "Schloss" to French is easier if we can feed in the English translation ("castle" or "lock").

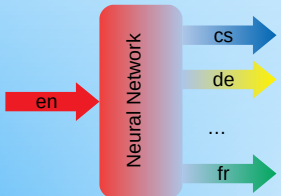


Figure: Multi-Target MT

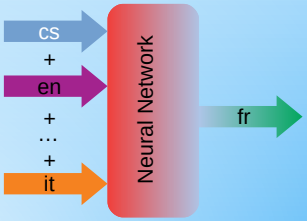


Figure: Multi-Source MT

Training for Multilinguality

- Collect multi-parallel or bi-parallel multilingual corpora.
- Simply mix in all the language pairs:

Source Sent 1 (De)	**2en** versetzen Sie sich mal in meine Lage !
Target Sent 1 (En)	put yourselves in my position .
Source Sent 2 (En)	**2nl** I flew on Air Force Two for eight years .
Target Sent 2 (Nl)	ik heb acht jaar lang met de Air Force Two gevlogen .

- There are challenges as well as wishful thinking; read more:

Kocmi Tom, Macháček Dominik, Bojar Ondřej (2021). **The Reality of Multi-Lingual Machine Translation**. ISBN 978-80-88132-11-0. 191 pp.
https://ufal.mff.cuni.cz/books/2021-kocmi

Speech Translation from Source or Interpreter?

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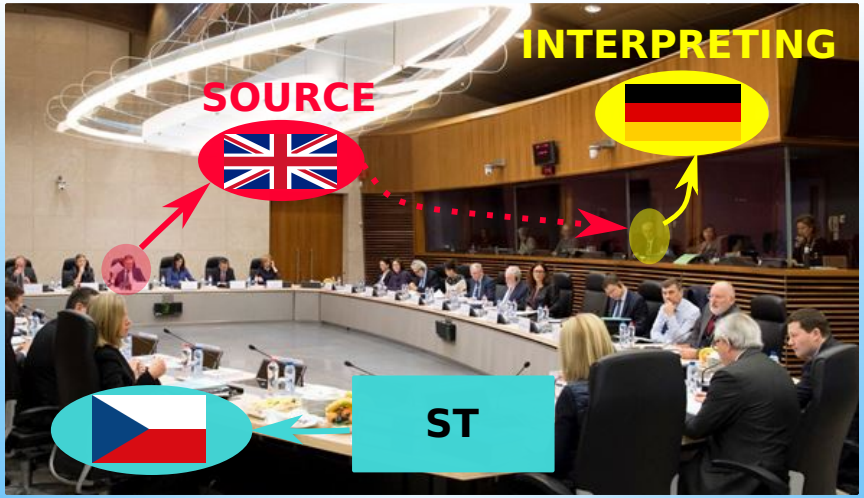

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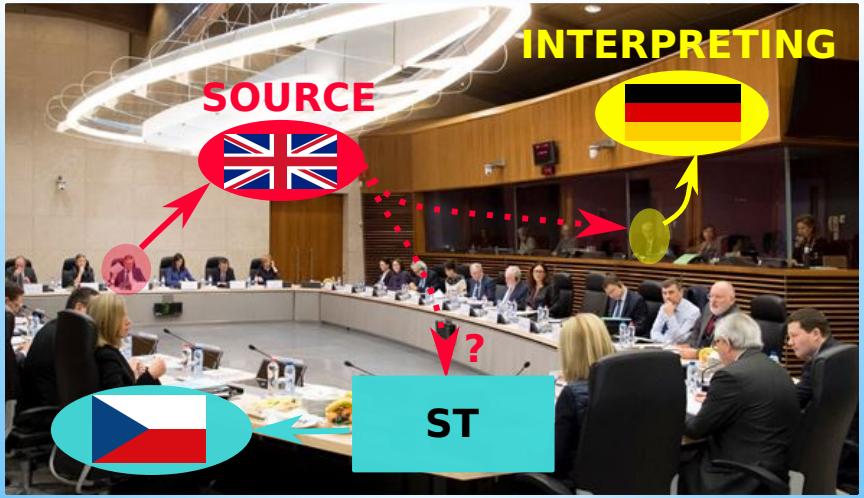

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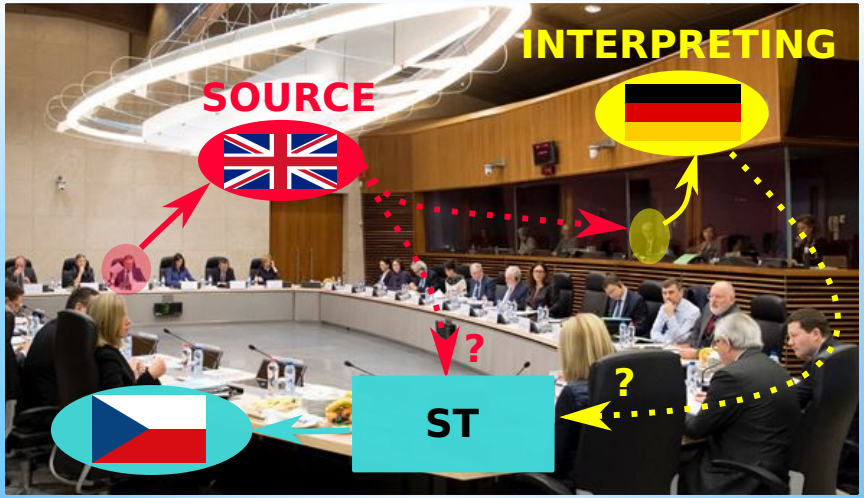

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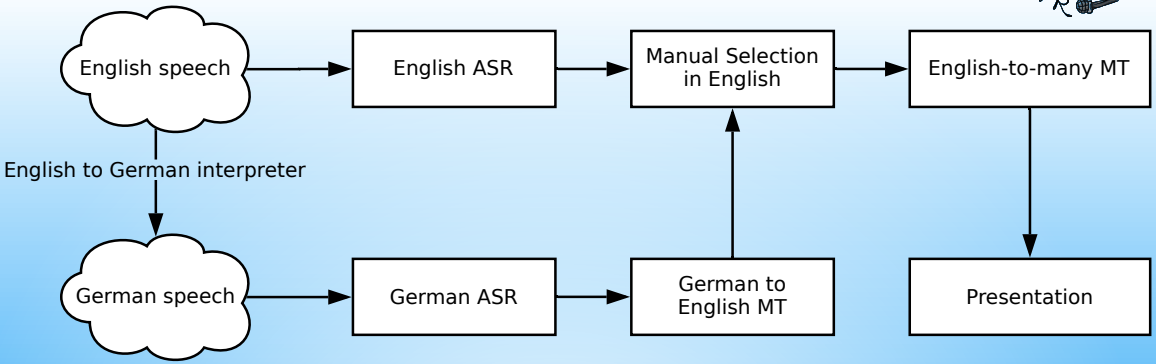
ELITR's Answer: Follow All



More details in Bojar et al. (2021), **Operating a Complex SLT System with Speakers and Human Interpreters**; https://aclanthology.org/2021.mtsummit-asltrw.3/

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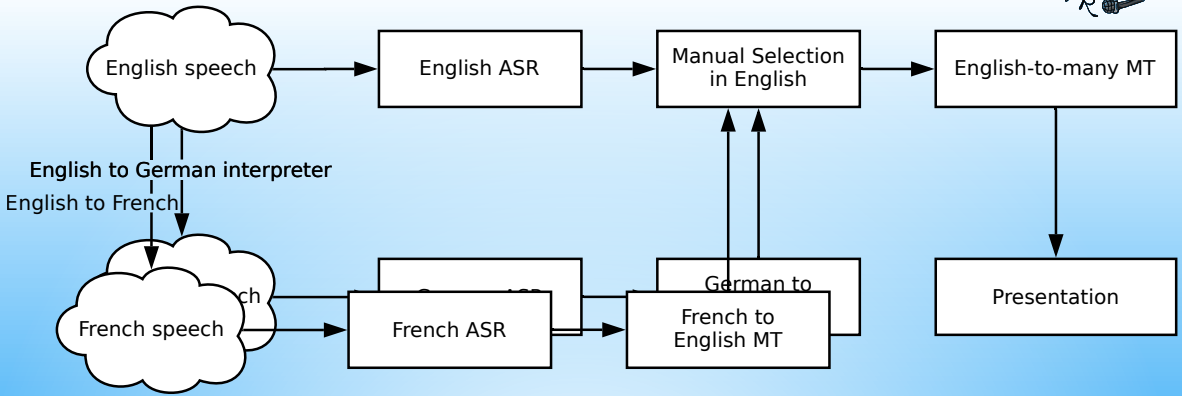

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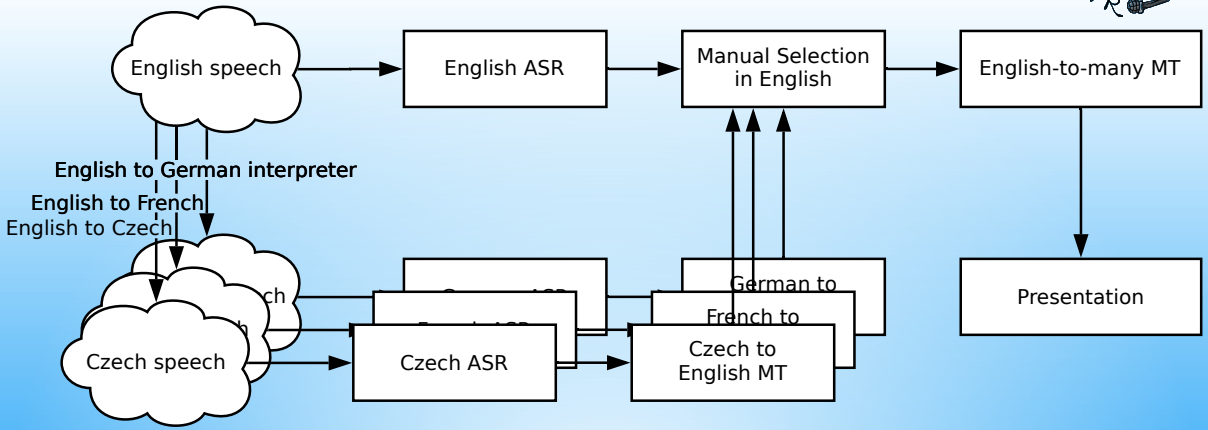

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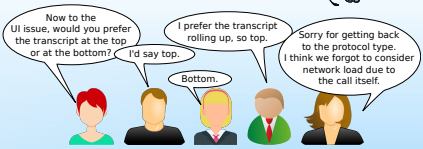
Various Demo Videos

- Initial test at 2019 Student Firms Fair:
  `https://elitr.eu/the-reverse-babelfish/`
- CUNI Open Doors Day:
  `https://elitr.eu/a-tireless-interpreter/`
- ASR demo in Full Lecture on Complexity of ELITR Goals:
  `https://lectures.ms.mff.cuni.cz/view.php?rec=455`
- Unpublished demo of Czech→many subtitling:
  `http://ufallab.ms.mff.cuni.cz/~bojar/elitr/720p.mp4`
- *Popularization of SLT in conference setting:*
  `https://www.youtube.com/watch?v=WZy5cGY7JFc`

Automatic Meeting Summarization (Minuting)

AutoMin 2023:

- Second instance of our shared task.
- Automatic creation of meeting minutes from (manually corrected) ASR transcripts.
- *Task A*: Creating minutes.
- Task B&C: Matching minutes and transcripts.
- *Task D*: Evaluating minutes.



Original agenda as prepared by the organizer beforehand:
- Protocol type: push or pull?
- Layout of the user interface:
  - Transcript grows at the top or bottom of the document?
  - Or in a side pane?

Shared document, everyone allowed to edit.
Starts with the agenda and gets populated by Automatic Minuting AM
- Protocol type: push or pull?
  AM > Pull easier to implement.
  AM > Updates can get lost with push *in case the user is*
  AM > Consider network load.
- Layout of the user interface:
  - Transcript grows at the top or bottom of the document?
    AM > Top AM > Bottom AM > Top, transcript rolling up.
  - Or in a side pane?

Transcript, optionally editable to correct ASR errors:
11:03 Sorry for getting back to the protocol type. I think we forgot ...
11:02 I prefer the transcript rolling up, so top.
11:02 Bottom
...

Take part! `https://ufal.github.io/automin-2023/`.

Bergamot

http://browser.mt/

Browser-Based Multilingual Translation

A Horizon 2020 Research and Innovation Action

Grant agreement No. 825303

THE UNIVERSITY *of* EDINBURGH

CHARLES UNIVERSITY

moz://a

The University Of Sheffield.

UNIVERSITY OF TARTU

Motivation for Bergamot

- Statoil (Norwegian state oil company) employment information and contracts leaked on Translate.com –Norsk Rikskringkasting, 2017
  - Translate.com: There was a clear note on our homepage stating: 'All translations will be sent to our community to improve accuracy'; 'some of these requests were indexed by search engines such as Google and Microsoft at that time.'
- At European Commission, eTranslation runs on Azure
  - ⇒ Security concerns.

    See e.g. `https://firewalltimes.com/microsoft-data-breach-timeline/`

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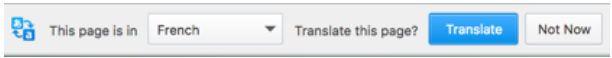
Don't trade your privacy for Google Translate.

Bergamot Goals and Features

Client-side neural machine translation as a Firefox extension.



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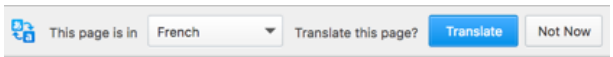
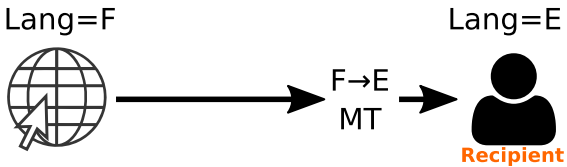


Local processing $\Longrightarrow$ *Private*.

- Broad dissemination as a Firefox extension + open platform (Marian)
- Fast on a desktop
- Trustworthy
- Support web forms

Inbound vs. Outbound Translation (OT)

Inbound translation



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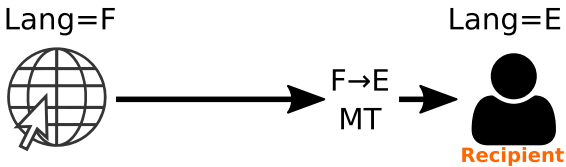
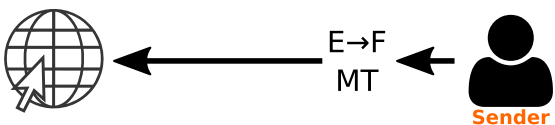


Outbound translation



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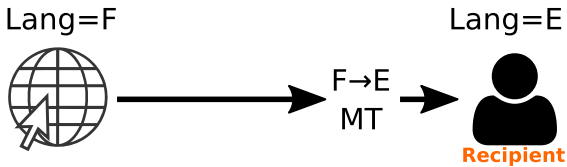
Inbound translation



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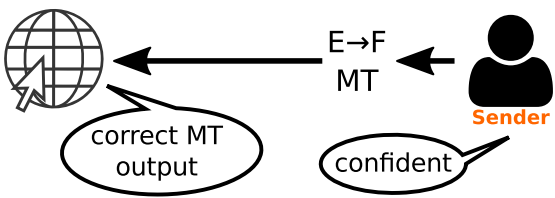

Outbound MT as an Interactive Process

1. User provides and modifies their input.

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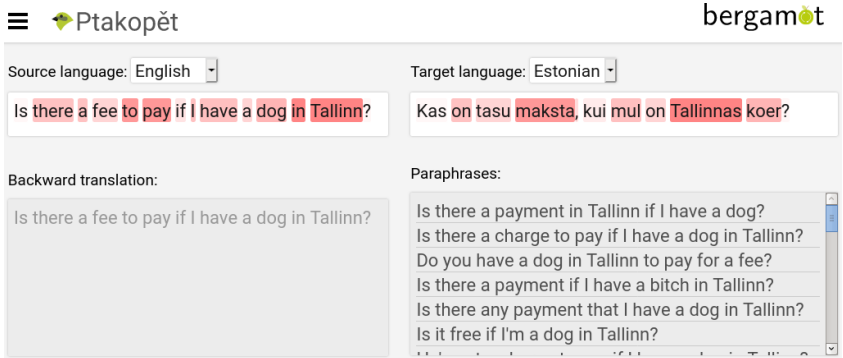

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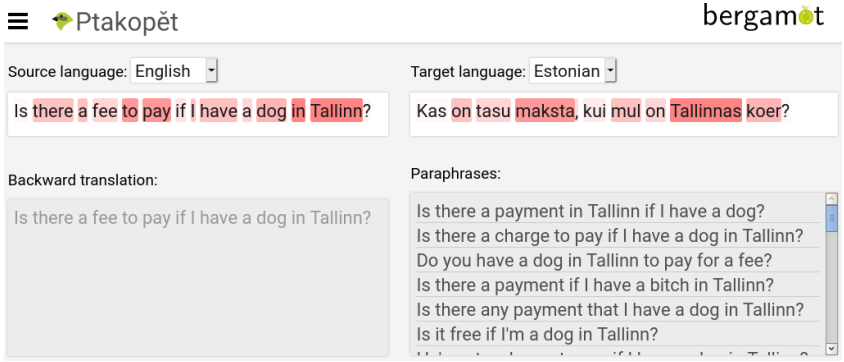

Result: Only *back-translation* helps, only *in confidence* (not quality).

Remarks on Coordination

Project Preparation

- Allow plenty of time (3 months minimum) for the vision to settle.
  - Even if *you* have the vision clear, almost all partners have to share it.
- Try to match the call requirements as closely as possible.
  - . . . this is the hardest part to me.
- Observe all formal conditions; although the EC focuses on the content more than formalities.
- Start submitting early; unexpected questions will emerge in the process.

Project Startup

- Once awarded, expect *a lot* of formal work.
  - Consortium agreement has to be prepared and signed by all.
- Stick to the vision as it was written, and follow it.

Project Execution

- Be ready to respond to unexpected developments.
- Do not worry to deviate from the plan.
- Just be honest with yourselves as scientists.
- Report and explain everything.
  - You will be evaluated by your fellows, they know the business.

Communication Strategies

- Every team has their *own and specific* established means of communication.
- Rather then forcing unified communication platforms *let most people keep working as they were used to*.
- Learn and use all the individual means your members use.
  - Yes, we made landline calls in German to extract the information from our partners.

Be Stable, Believe in Self-Organization

- Conditions may (and will) change abruptly in the project lifetime.
  - Change in the state of the art.
  - Change at one of the members institution.
- Be ready to digest them, modify project as needed.
- Show full trust in your partners, have and let them play their roles.

Fight with the Nature, not Fellows

- Whenever you sense a tension,
  always refocus to the original vision and goal of the project.
- It makes no sense to prove who was the culprit.
- The goal is to solve the problem.
- Use tiny psychological tricks on yourselves.
  - Put very simply, it is much more helpful to say "I am sorry" instead of "You foolish stubborn freak."

Summary

ELITR

http://elitr.eu/

Multilinguality & Minuting

- ELITR used *multiple sources and multi-lingual target*.
  - Ideal setup for *expanding the set of offered languages*, complementing human interpreters.
- Join us for *AutoMin 2023*, minuting and its evaluation.

Bergamot

http://browser.mt/

Privacy & Trust

- Open-source MT toolkit + models scaled down for CPU.
- Released as *Firefox Translation* Add-On.
- Allows to *write in a language you do not speak* with some confidence.

- Some remarks on project coordination.

Thank you!

ELITR

ÚFAL