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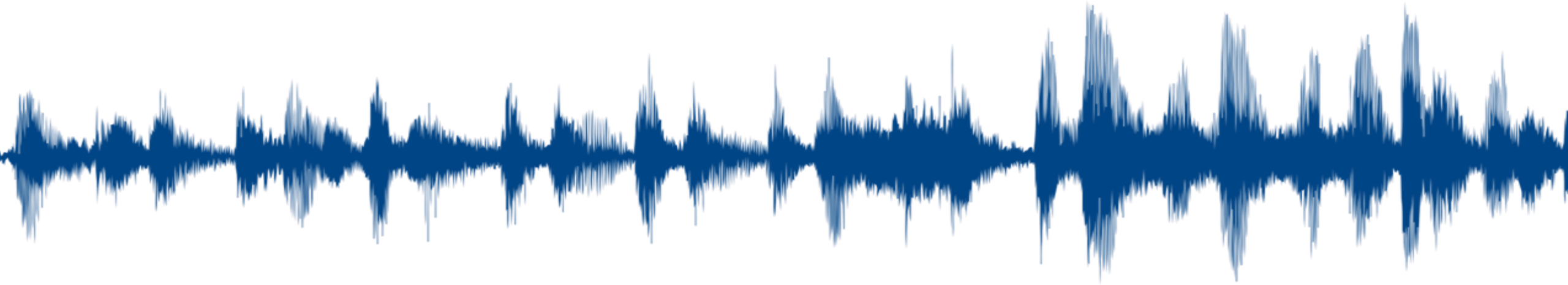
The use of speech technologies in translation, revision, and post-editing machine translation (PEMT)



Raluca Chereji, Claudia Wiesinger, Justus Brockmann, Alina Secară, Dragoș Ciobanu

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Outline

1. HAITrans research group
2. Speech recognition technology
3. Speech synthesis technology
4. HAITrans research projects

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HAITrans research group

- Human and Artificial Intelligence in Translation
  - Zentrum für Translationswissenschaft (ZTW)
  - University of Vienna
- Focus on translation technologies
  - Education
  - Industry
  - Research

https://haitrans.univie.ac.at/team/

Univ.-Prof. Dragoș Ciobanu, PhD (Lead)

Alina Secară, MA PhD (Senior Scientist) -associate member-

Miguel Rios, PhD (Post doc)

Justus Brockmann, BA MA (Prae doc)

Raluca Chereji, BA MSc (Prae doc)

Claudia Wiesinger, BA MA MA (Prae doc)

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HAITrans research group

- Education

EMT

IAMLADP International Annual Meeting on Language Arrangements, Documentation and Publications

- Industry

European Commission

GALA Globalization & Localization Association

EDUinLOC

TRANSLATION COMMONS

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HAITrans research group

- Research

Speech technologies in translation, revision and post-editing (PEMT)

Technology-supported translation, revision and PEMT

Translation technology for accessibility

Translation technology didactics

Automatic speech recognition (ASR)/Speech-to-text (S2T)

“allows a computer to take the audio file or direct speech from the microphone as an input and convert it into the text”

(Malik *et al.*, 2021: 9412)

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ASR applications

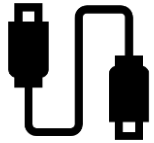
- **Wide variety of domains and industrial use cases:**

Healthcare & medical assistance

Telecom-munications industry

Forensics and law enforcement

Defense and aviation



IT and consumer electronics

Home automation and security

Education and accessibility

(Vajpai and Bora, 2016; Kanabur, Harakannanavar and Torse, 2019; Ibrahim and Varol, 2020)

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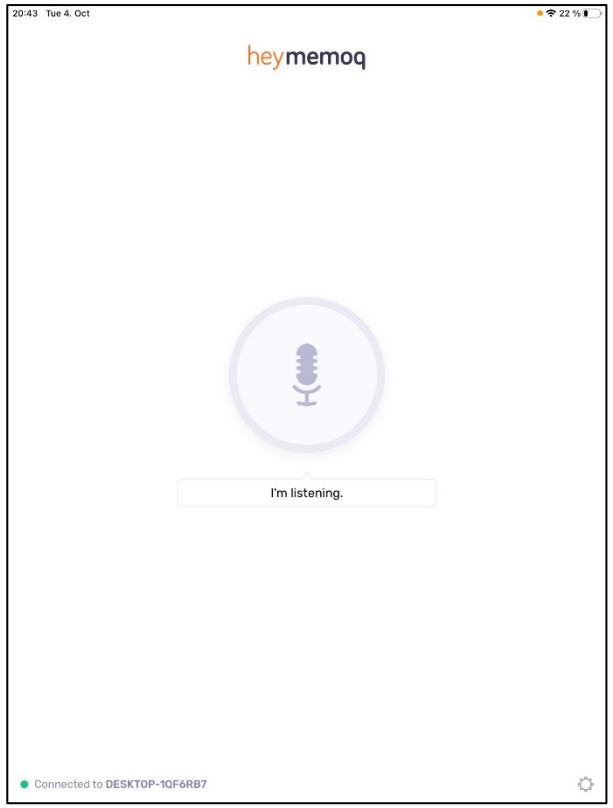
ASR applications

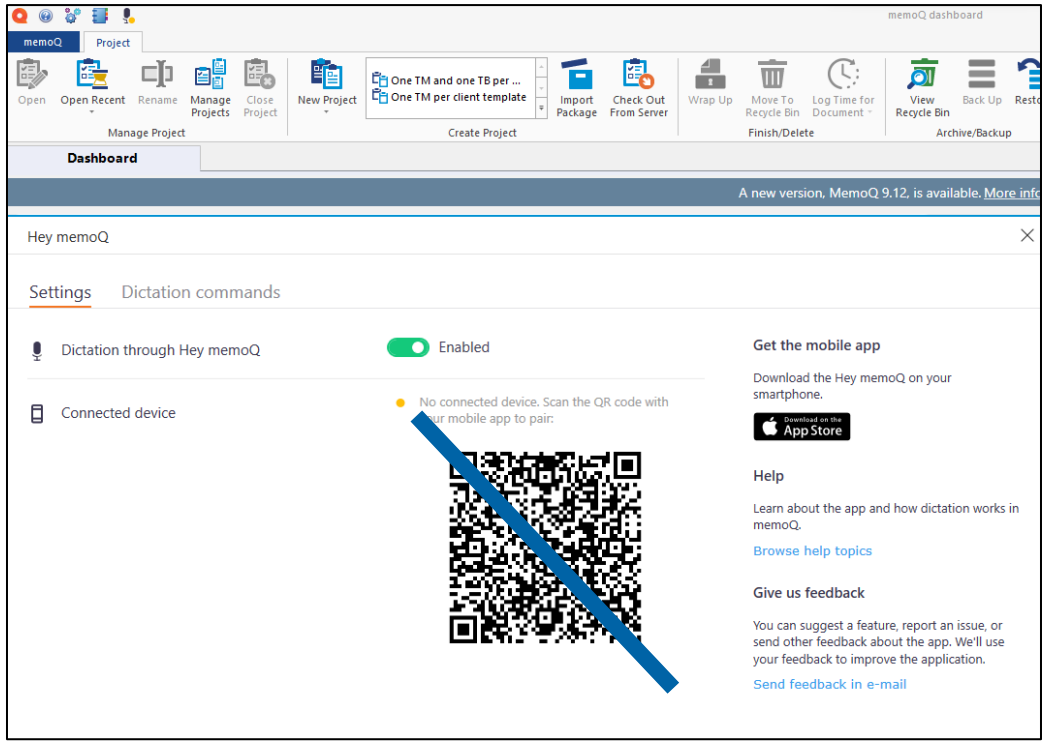
- **In a translation context:**
  - **Translation Process Research** on translation dictation and post-editing
    - (Ciobanu, 2014, 2016; Mesa-Lao, 2014; Zapata *et al*., 2017; Tzoukermann and Miller, 2018; Liyanapathirana, 2021)
  - ASR for **interpreting**
    - (Defrancq and Fantinuoli, 2021; Gaber and Corpas-Pastor, 2021)
  - **Respeaking** in audiovisual translation
    - (Romero-Fresco, 2020)
  - Multilingual **corpora building**
    - (Di Gangi *et al*., 2019; Iranzo-Sánchez *et al*., 2020; Salesky *et al*., 2021)

Integrating ASR into medical translation workflows – a demo

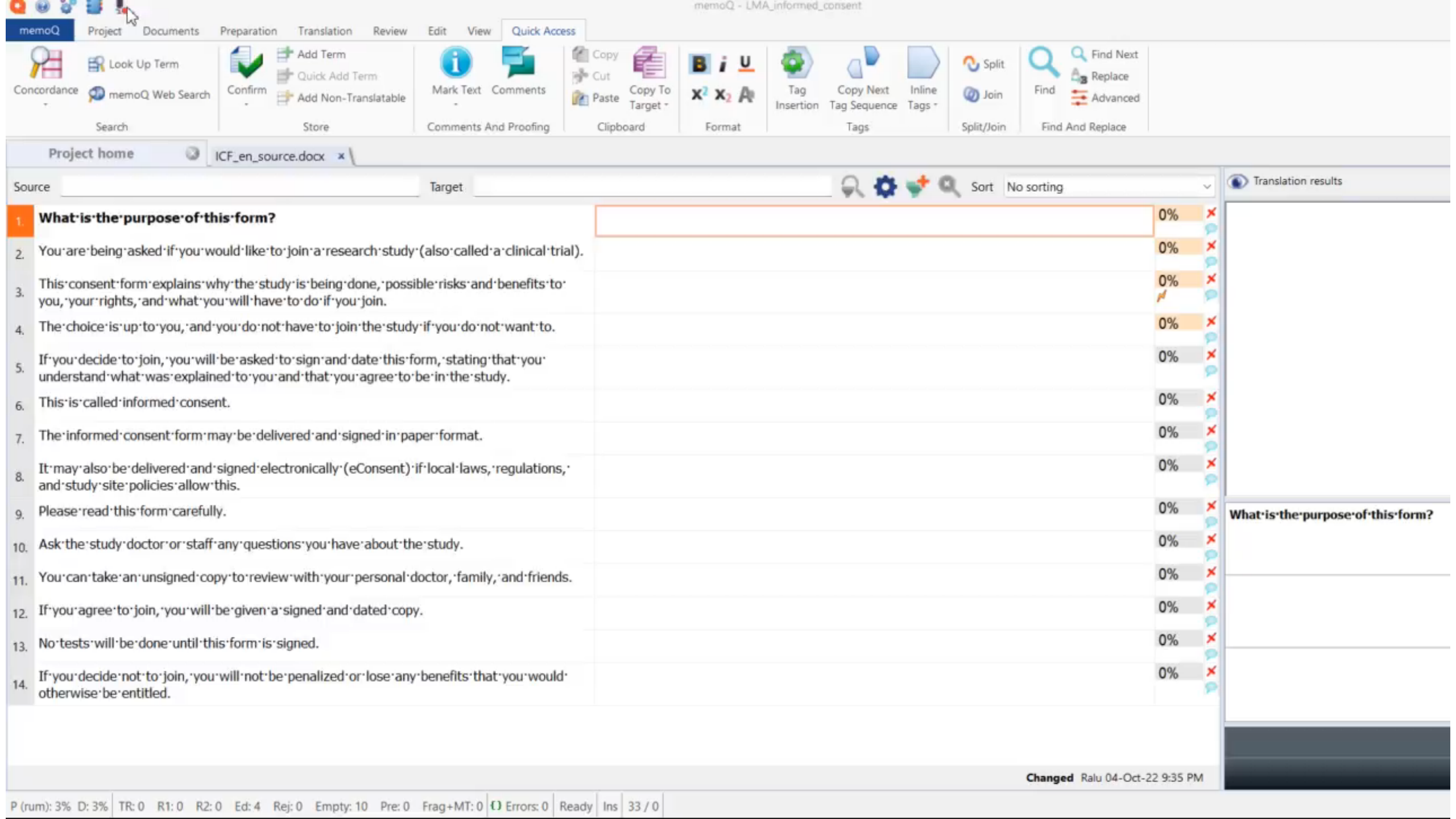
Set-up:



hey memoQ interface on iOS



memoQ desktop dashboard


memoQ - LMA_informed_consent
memoQ
Project
Documents
Preparation
Translation
Review
Edit
View
Quick Access
Concordance
Look Up Term
memoQ Web Search
Search
Confirm
Add Term
Quick Add Term
Add Non-Translatable
Store
Mark Text
Comments
Comments And Proofing
Copy
Cut
Paste
Copy To Target
Clipboard
Format
Tag Insertion
Copy Next Tag Sequence
Inline Tags
Tags
Split
Join
Split/Join
Find
Find Next
Replace
Advanced
Find And Replace
Project home
ICF_en_source.docx
Source
Target
Sort
No sorting
Translation results
1. What·is·the·purpose·of·this·form?
2. You·are·being·asked·if·you·would·like·to·join·a·research·study·(also·called·a·clinical·trial).
3. This·consent·form·explains·why·the·study·is·being·done,·possible·risks·and·benefits·to·you,·your·rights,·and·what·you·will·have·to·do·if·you·join.
4. The·choice·is·up·to·you,·and·you·do·not·have·to·join·the·study·if·you·do·not·want·to.
5. If·you·decide·to·join,·you·will·be·asked·to·sign·and·date·this·form,·stating·that·you·understand·what·was·explained·to·you·and·that·you·agree·to·be·in·the·study.
6. This·is·called·informed·consent.
7. The·informed·consent·form·may·be·delivered·and·signed·in·paper·format.
8. It·may·also·be·delivered·and·signed·electronically·(eConsent)·if·local·laws,·regulations,·and·study·site·policies·allow·this.
9. Please·read·this·form·carefully.
10. Ask·the·study·doctor·or·staff·any·questions·you·have·about·the·study.
11. You·can·take·an·unsigned·copy·to·review·with·your·personal·doctor,·family,·and·friends.
12. If·you·agree·to·join,·you·will·be·given·a·signed·and·dated·copy.
13. No·tests·will·be·done·until·this·form·is·signed.
14. If·you·decide·not·to·join,·you·will·not·be·penalized·or·lose·any·benefits·that·you·would·otherwise·be·entitled.
0%
What·is·the·purpose·of·this·form?
Changed Ralu 04-Oct-22 9:35 PM
P (rum): 3% D: 3% TR: 0 R1: 0 R2: 0 Ed: 4 Rej: 0 Empty: 10 Pre: 0 Frag+MT: 0 Errors: 0 Ready Ins 33 / 0

Automatic speech recognition (ASR)/Speech-to-text (S2T)

Advantages

- Increased **productivity**
  - (Dragsted *et al.*, 2011; García Martínez *et al*., 2014; Zapata *et al.*, 2017; Liyanapathirana and Bouillon, 2022)
- Improved **ergonomics**
  - (Ehrensberger-Dow and O'Brien 2015; Ehrensberger-Dow and Hunziker Heeb, 2016)
- Improved **accessibility**
  - (Lewis, 2015; Ciobanu and Secară, 2019; Lucía *et al*., 2020)
- Improved output **naturalness**
  - (Ciobanu, 2016)

Automatic speech recognition (ASR)/Speech-to-text (S2T)

Challenges

- Risk of **introducing errors**
  - ‘Speakos’ over typos (Ciobanu, 2016), e.g., homophones (Dragsted *et al*., 2011)
- **Accessibility** issues
  - (Tobin *et al*., 2022)
- Potential **increase in cognitive load**
  - (Ciobanu, 2016)
- More **colloquial and informal** translation choices
  - (Ciobanu, 2016)

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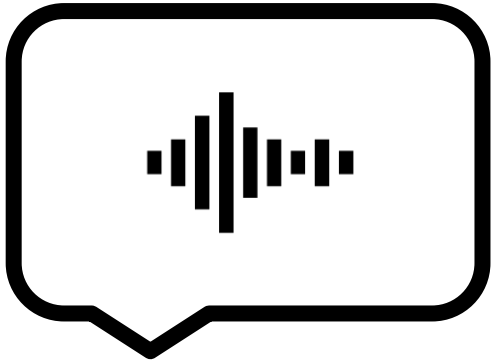
Speech synthesis/Text-to-speech (T2S)



“getting computers to read out loud” (Taylor, 2009: 1)

“automatically converting natural language text into speech” (Georgila, 2017: 257)

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Applications

- **Variety of scenarios, including:**
  - automatic call-centre dialogue systems, announcements of travel directions (Taylor, 2009)
  - voice user interfaces in vehicles (Chen *et al*., 2010)
  - accessibility solutions (Freitas, 2010)
  - personal assistants (e.g. Google, n.d.)

(cf. Olohan, 2019)

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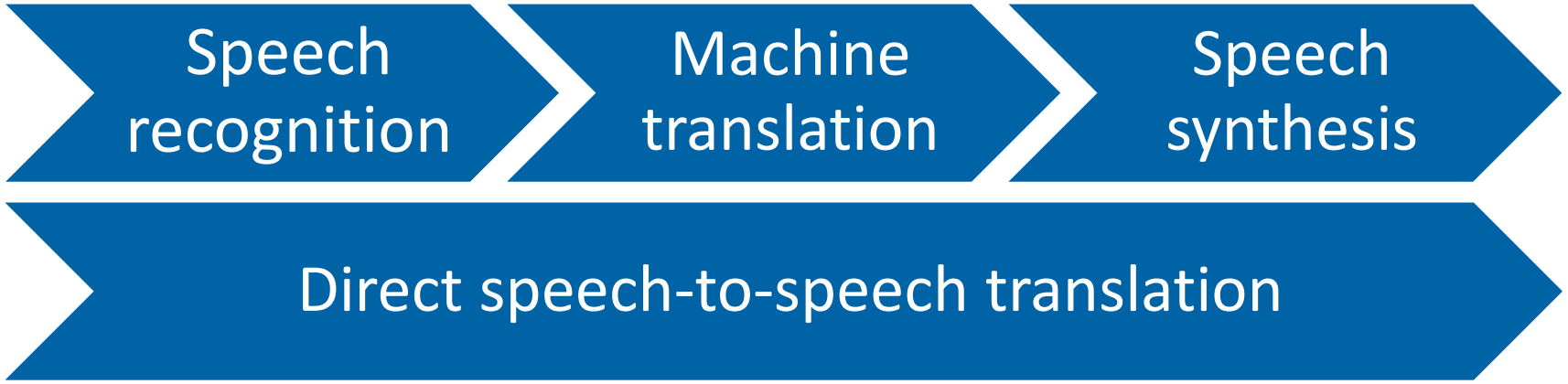
Applications

- **In a translation and interpreting context:**
  - Mainly focused on automatic speech-to-speech translation (Ehsani *et al*., 2010; Hashimoto *et al*., 2011; Tan, 2014; Seligman *et al*., 2017)



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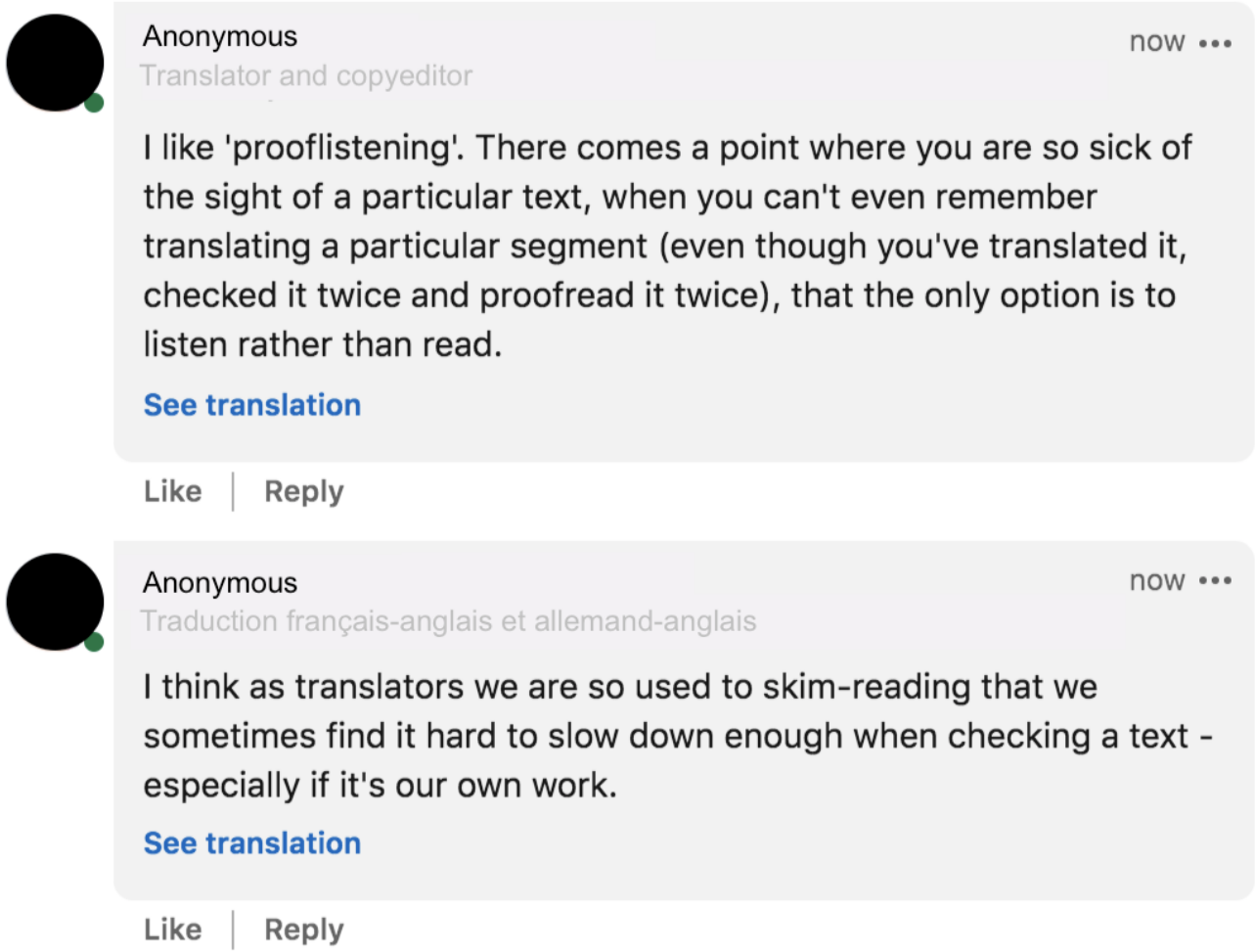
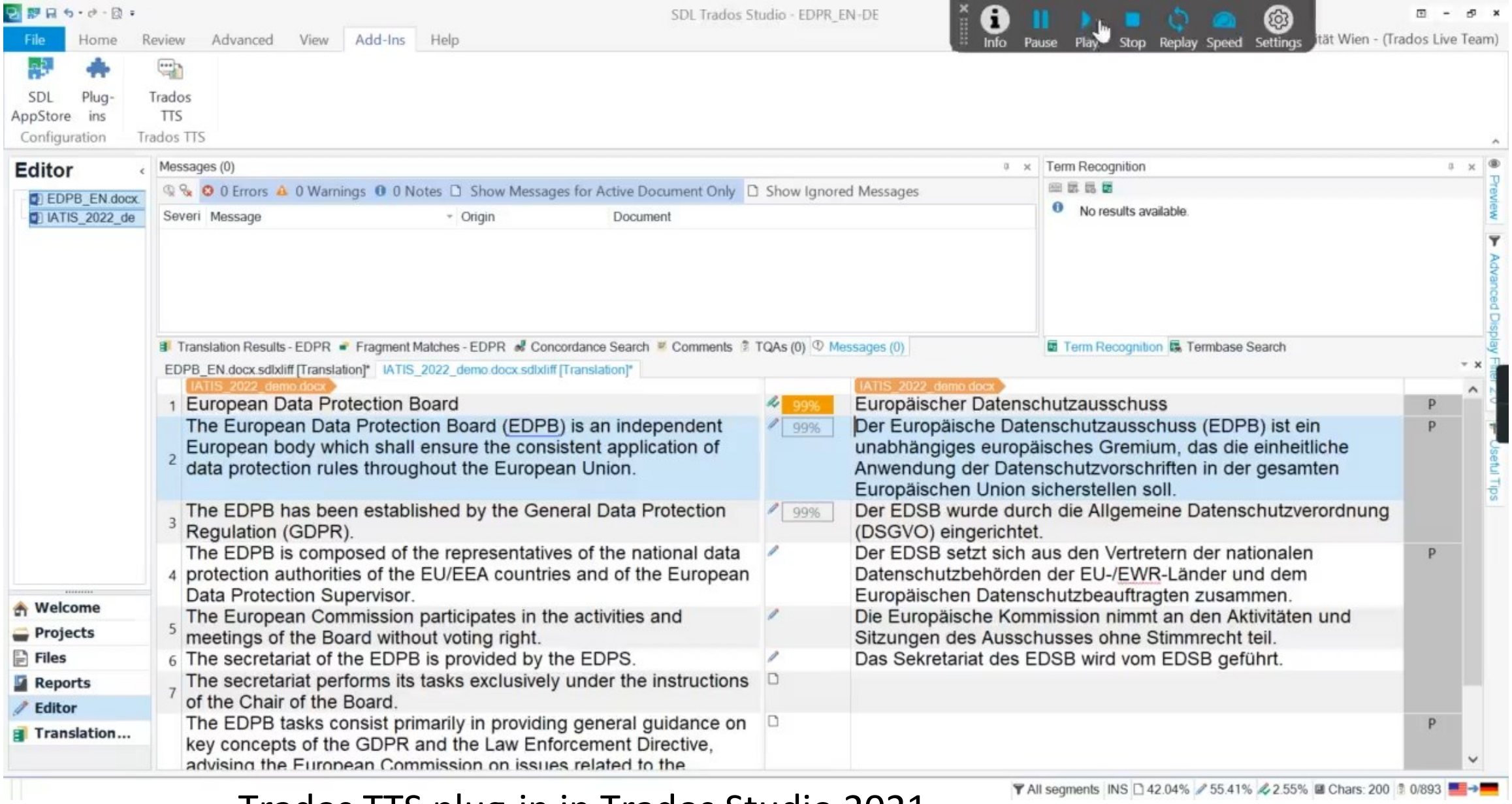
Applications

- **In a translation context:**
  - Speech synthesis used to support revision process/quality checks of dictated text (Ciobanu, 2016)
  - Practice of reading aloud in (self-)revision (Allain, 2010; Scocchera, 2017)

- **But: No default integration with CAT tools (yet)**





Trados TTS plug-in in Trados Studio 2021

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Applications

- Initial investigations of applications in human-centred revision and post-editing workflows

1. **Speech synthesis in revision (2019)**
2. **Speech synthesis in post-editing performed by students (2021)**
3. **Speech synthesis in post-editing performed by professional translators (forthcoming)**

The use of speech synthesis in revision – Experiment (2019)

Experimental design

5 professional translators,
6 trainees
(MA level)

FR-EN **revision** task in memoQ

in silence,

with source text sound

methods

- error counts
- questionnaires
- eye tracking

impact of sound on

- quality
- attitudes
- viewing behaviour

(Ciobanu *et al.*, 2019; Secară and Ciobanu, forthcoming)

The use of speech synthesis in revision – Experiment (2019)

Findings

RQ1 (quality)	• Source text (ST) sound conducive to better revision quality overall ➢ Biggest difference in relation to Accuracy errors (66% vs. 37%)
RQ2 (attitudes)	• Majority of participants (7 out of 11) preferred ST sound to silence
RQ3 (viewing behaviour)	• Attention distribution (between ST, target text (TT) and external resources) is similar in both conditions • Intensity of reading ST is decreased in ST sound condition

(Ciobanu *et al*., 2019; Secară and Ciobanu, forthcoming)

The use of speech synthesis in PEMT – Experiment (2021)

Experimental design

17 trainees
(16 BA, 1 MA)

4 EN-DE **post-editing** / **error annotation** tasks in Microsoft Word

methods

impact of sound on

in silence,

with ST sound,
with TT sound,
with ST and TT sound

- error counts
- error annotation analysis
- post-edited words/h
- questionnaires

- quality
- error annotation
- productivity
- attitudes

(Brockmann *et al.*, 2022; Wiesinger *et al.*, forthcoming)

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The use of speech synthesis in PEMT – Experiment (2021)

Findings

RQ1 (quality)	• On average, the combination of ST and TT sound appeared to be most conducive to correcting errors in line with Gold Standard • Major variation between individuals
RQ2 (error annotation)	• High disparity in annotations • More 'preferential annotations', but also fewer actual errors missed using ST and TT sound, as compared to working in silence • Highest number of Accuracy errors annotated in ST sound condition
RQ3 (productivity)	• On average, productivity increase from PEMT in silence to PEMT with ST and TT sound • Major variation between individuals
RQ4 (attitudes)	• Perceived benefits of using sound in less strict set-ups

(Brockmann *et al*., 2022; Wiesinger *et al.,* forthcoming)

The use of speech synthesis in PEMT – Experiment (forthcoming)

- Imminent Research Grants scheme 2021
- Planned experiment design:

30 professional translators

4 EN-DE **post-editing** tasks in Matecat

in silence,

with ST and TT sound

methods

- eye tracking
- editing log
- error counts
- questionnaires

impact of sound on

- cognitive load
- productivity
- quality
- attitudes

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HAITrans doctoral projects

- Applications of speech technology in:

Crisis translation

Institutional translation

Medical translation

Doctoral project – Crisis Translation

Claudia Wiesinger

"**Timely** and **accurate** communication is essential for crisis management […]"

(Crisis Translation, 2020; own emphasis)

- Suspected widespread use of MT in disasters and crises
  (Anastasopoulos *et al*., 2020)
- Recommendations for MT-assisted crisis translation workflows
  (Parra Escartín and Moniz, 2020)
- Difficulties striking a balance between quality assurance processes and timely translations

Source: leftcom.org, licensed under CC BY

Q: Speech-enabled PEMT – a viable solution for crisis translation?

Doctoral project – Institutional Translation

Justus Brockmann

Source: own photograph

In multilingual settings, **institutions govern by translation**
(Koskinen, 2014)

- High quality requirements
  (Biel *et al*., 2017; Prieto Ramos, 2017; DGT, 2020)
- Increasing productivity demands on translators
- Increasing use of MT by institutions

Source: own photograph

Q: Can speech synthesis support the PEMT process in a translating institution?

Source: own photograph

Survey on technology use in institutional translation / revision / post-editing

https://bit.ly/3TP8okZ

Patient-facing medical texts:

- "must be translated intralingually […] from expert language to plain language"
  (Brøgger and Zethsen, 2021)
- "there is a tendency to revert to expert medical language" in translation
  (Montalt, Zethsen and Karwacka, 2018)
- ASR-produced translations as more natural-sounding and colloquial
  (Ciobanu, 2016)

Q: Can ASR benefit patient-facing translations and mitigate expert-to-lay bias?

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Conclusions

- Potential of **speech technologies**
  - Supported by research results
  - Especially relevant given the growth of NMT deployment

- Investigation of **contexts in which these tools could be integrated** in translators' workflows (doctoral projects)

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Thank you and Q&A

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