

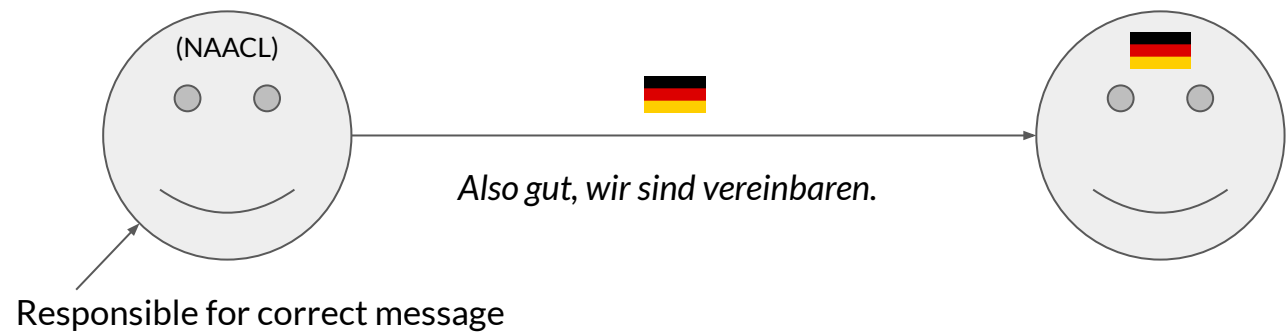
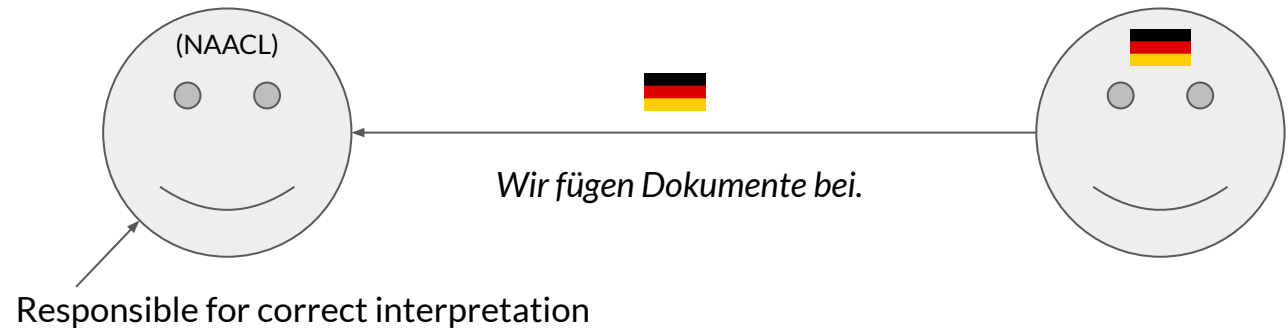
Backtranslation Feedback Improves User Confidence in MT, Not Quality

Vilém Zouhar, Michal Novák, Matúš Žilinec, Ondřej Bojar, Mateo Obregón,
Robin L Hill, Frédéric Blain, Marina Fomicheva, Lucia Specia, Lisa Yankovskaya

 Charles University  University of Edinburgh  University of Sheffield
 University of Wolverhampton  University of Tartu

NAACL 2021

Inbound vs. Outbound Translation



Ptakopět: environment for OT experiments

Translate the highlighted text in the online form into Czech.
Try to achieve the best possible translation quality.

Stimulus: 2/7, Block: 6/10

1 2 3 4 5

HELP SKIP NOTE

Source language: English

I'd like to request a room with access to the garden.

Target language: Czech

Chci pokoj s přístupem do zahrady.


Backward translation:

I want a room with access to the garden.


Paraphrases:

I'd like to ask the room with access to the garden.
I'd like to ask you for a room with access to the garden.
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I'd like to ask you to get the room to the hotel.
I'll ask you for a room with access to the port.
I'd like to ask you a room with access to the garden.


accomodation

 **HOTEL CIVILIN** ★★★★ HOME HOTEL

TERMS & CONDITIONS


☐ I agree with [Terms and cancellation conditions](#) and [Personal data processing conditions](#) 

☐ I do not want to receive any marketing communication

[hide note](#) 

I would like to have room with direct garden access

PAYMENT METHOD

 **PAYMENT UPON ARRIVAL WITHOUT GUARANTEE**
NON-BINDING REQUEST - AT THE HOTEL WITHOUT CREDIT CARD GUARANTEE
Thank you for your request. Please wait for confirmation or contact us.

Ptakopět: environment for OT experiments

- *A user wants to translate to a language that they do not understand*
- Receive cues that should inform about translation quality
- May rephrase the query while keeping its intention

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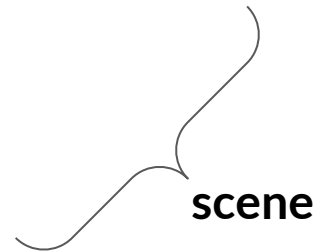
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 - High confidence of the user about the translation quality

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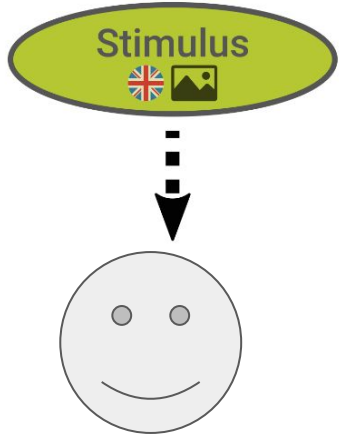
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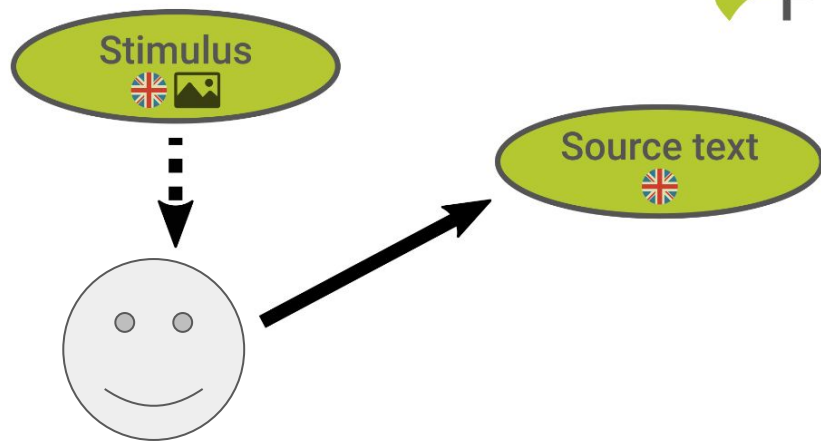


Experiment scene

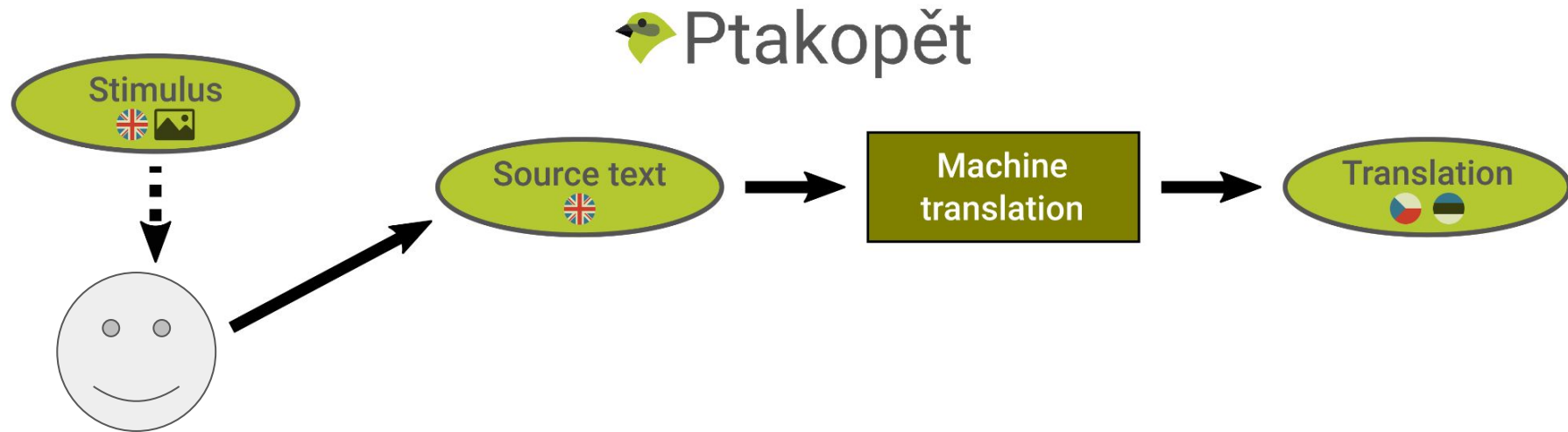
 Ptakopět



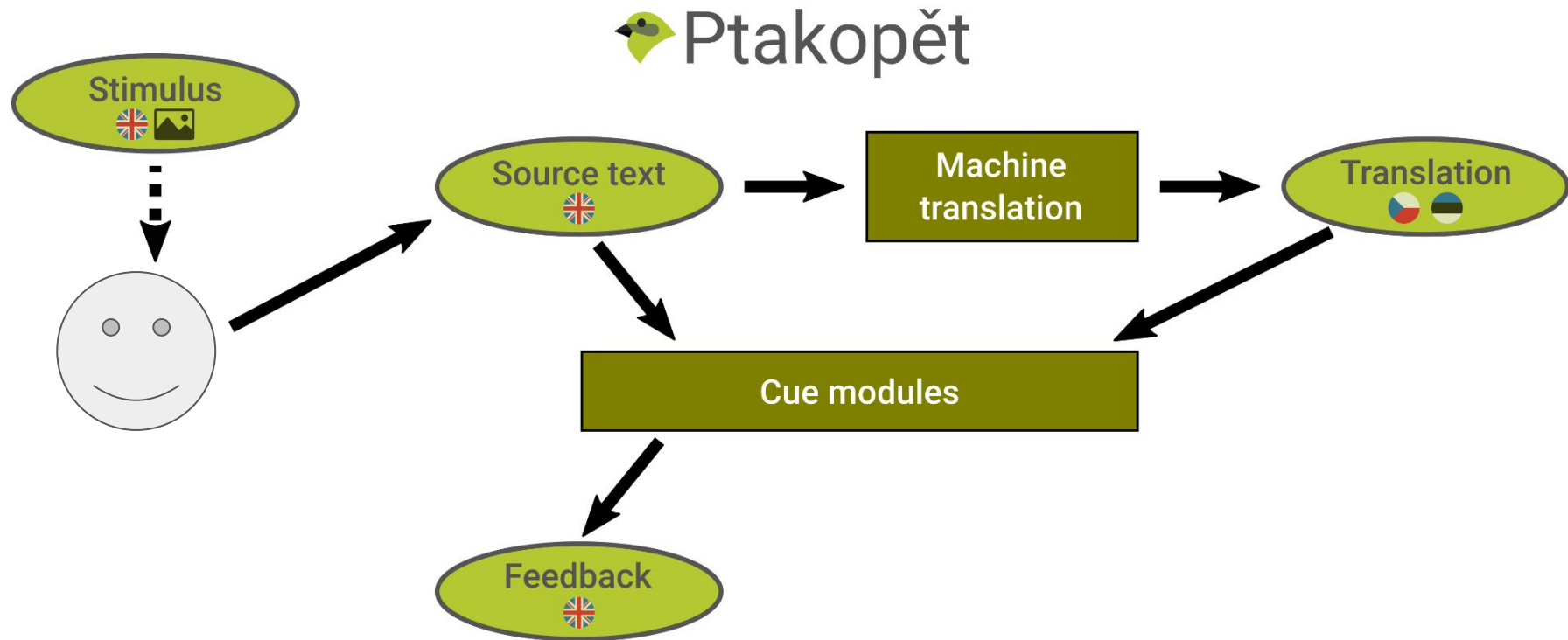
Experiment scene



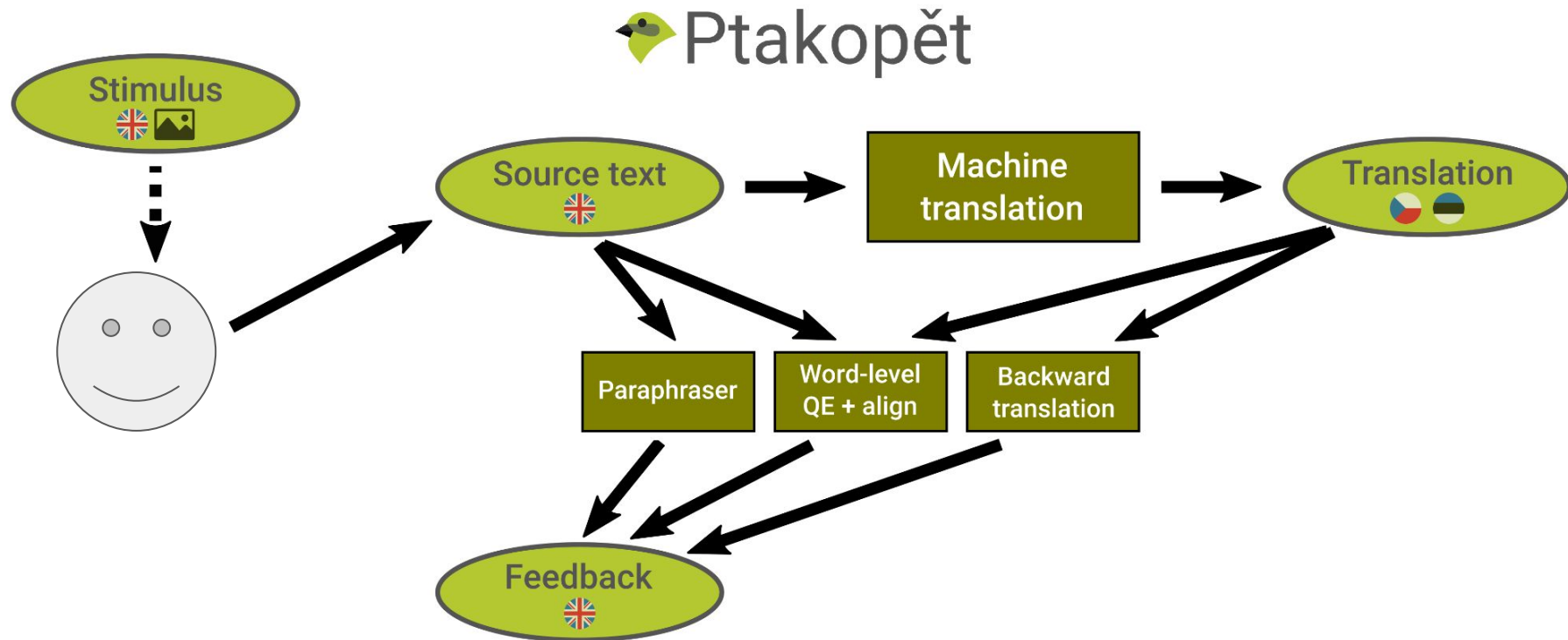
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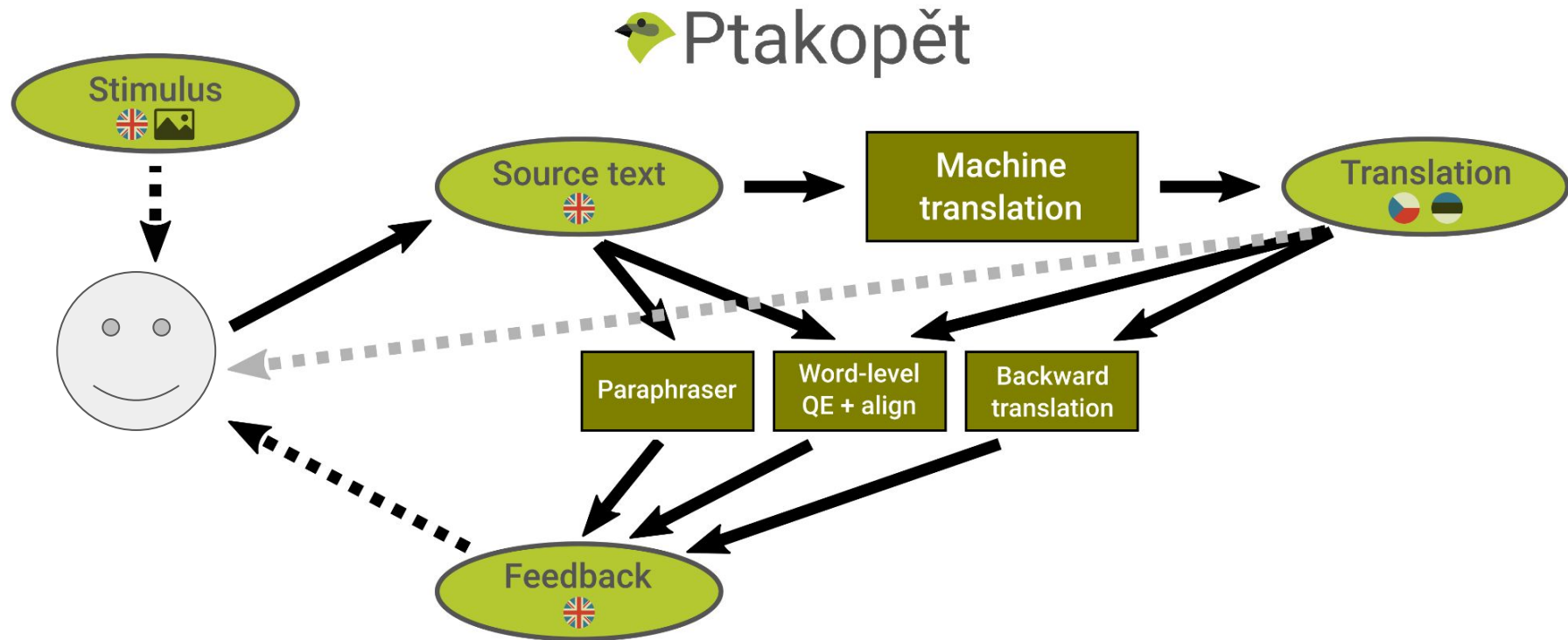
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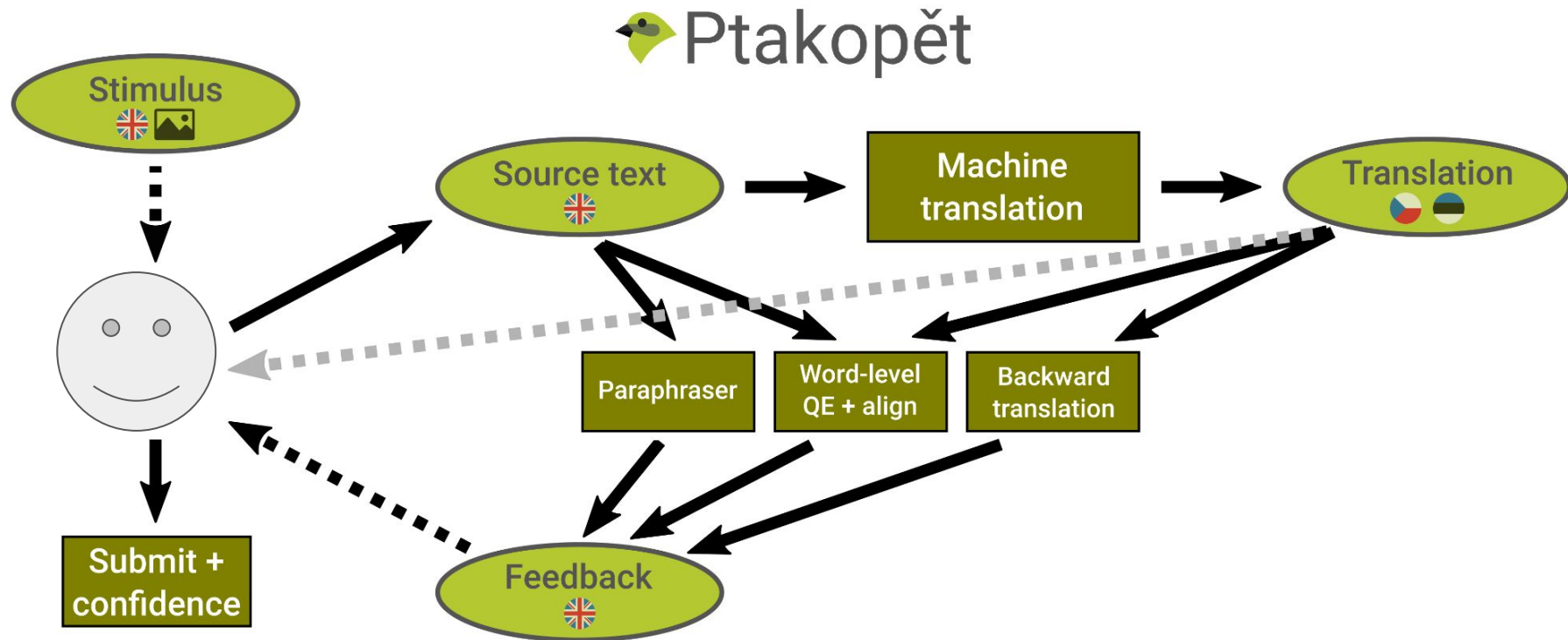
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Experiment scene



Experiment scene


Translate the highlighted text in the online form into Czech.
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Stimulus: 2/7, Block: 6/10

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HELP SKIP NOTE

accomodation



HOMEHOTEL

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hide note ^

I would like to have room with direct garden access

PAYMENT METHOD

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Thank you for your request. Please wait for confirmation or contact us.

Source language: English

I'd like to request a room with access to the garden.

Target language: Czech

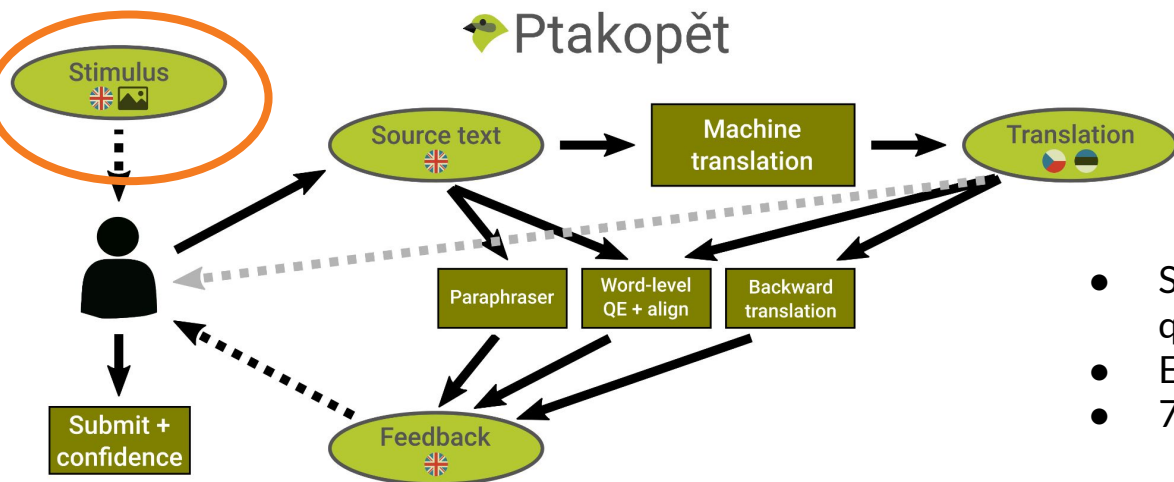
Chci pokoj s přístupem do zahrady.

Backward translation:

I want a room with access to the garden.

Paraphrases:

- I'd like to ask the room with access to the garden.
- I'd like to ask you for a room with access to the garden.
- I would like to ask you for a room with access to the harbor.
- I'd like to ask you to get the room to the hotel.
- I'll ask you for a room with access to the port.
- I'd like to ask you a room with access to the garden.



* Icons made by Freepik from www.flaticon.com

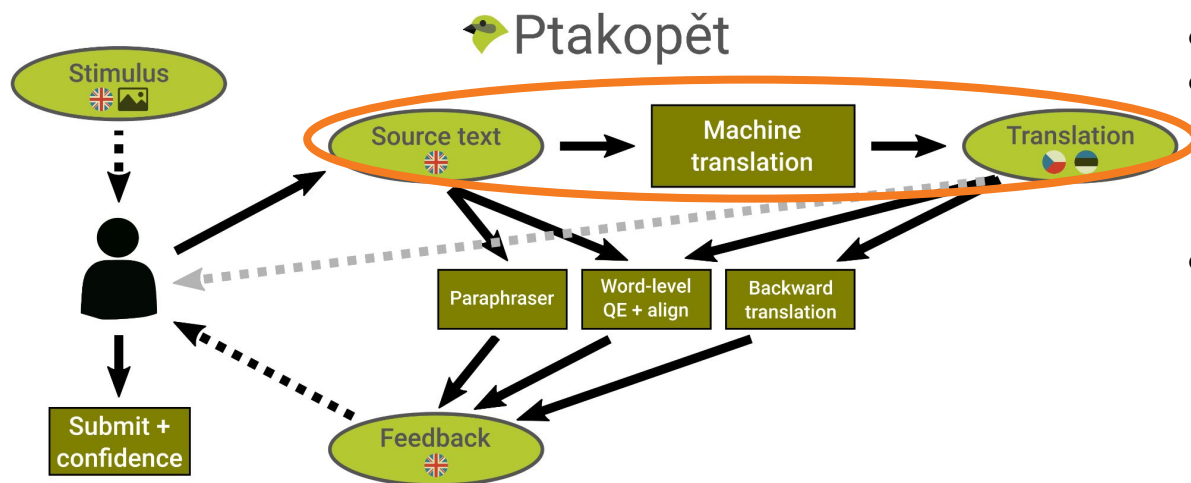
- Screenshots of web forms with a pre-filled query + website topic
- E-commerce domain
- 70 screenshots
 - Collected by 6 annotators
 - Annotators looked for web forms that contain fields to be filled with a text that requires translation

The screenshot shows a web form for a hotel booking. The top part of the form is highlighted with a green box and a red circle. The highlighted text is: "I would like to have room with direct garden access". The form includes sections for "TERMS & CONDITIONS", "PAYMENT METHOD", and "Backward translation". The "Backward translation" section shows the text: "I want a room with access to the garden." The "Paraphrases" section shows several variations of the text, including "I'd like to ask the room with access to the garden.", "I'd like to ask you for a room with access to the garden.", "I would like to ask you for a room with access to the garden.", "I'd like to ask you to get the room to the hotel.", "I'd like to ask you for a room with access to the port.", and "I'd like to ask you a room with access to the garden."

Example

STIM: [accommodation] I would like to have room with direct garden access.

Machine Translation



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Translate the highlighted text in the online form into Czech.
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Stimulus: 2/7, Block: 6/10

Source language: English

Target language: Czech

HELP SKIP NOTE

accomodation

HOTEL CIVILIN HOME HOTEL

TERMS & CONDITIONS

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PAYMENT METHOD

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NON-BINDING REQUEST - AT THE HOTEL WITHOUT CREDIT CARD GUARANTEE
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Backward translation:

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Paraphrases:

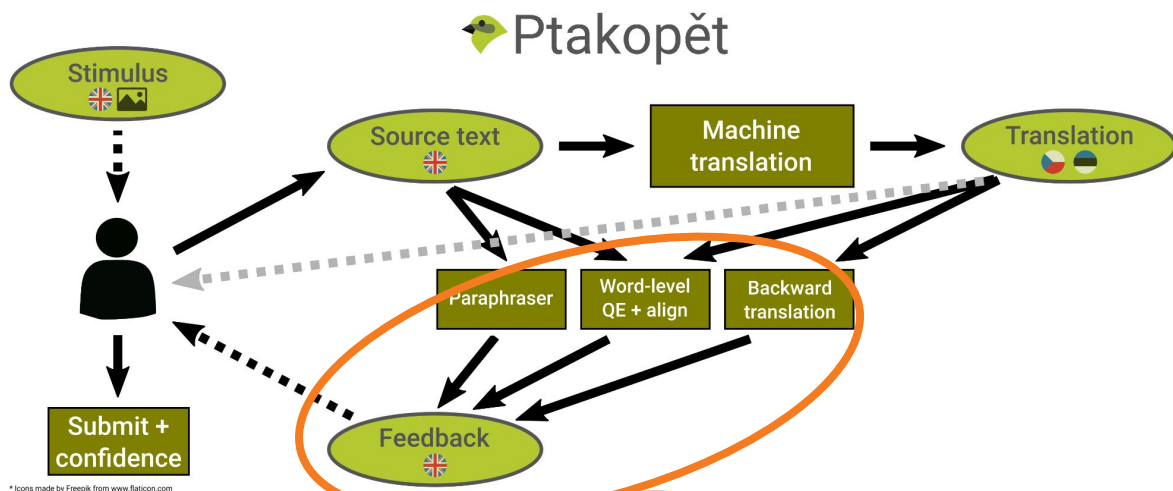
I'd like to ask the room with access to the garden.
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I'd like to ask you to get the room to the hotel.
I'll ask you for a room with access to the port.
I'd like to ask you a room with access to the garden.

- Transformer-based models
- Czech Teacher (Czech 3)
 - Winning CS-EN system at WMT'19 News Translation Shared Task
- Czech Student (Czech 2)
 - CPU-optimized student created by knowledge distillation using Teacher
 - Much faster
 - Worse by 0.5-3.0 BLEU
- Czech weak teacher (Czech 1)
- Estonian Student
- Randomly select

Example

STIM: I would like to have room with direct garden access.
SRC: I'd like to request a room with access to the garden.
MT: Chci pokoj s přístupem do zahrady.

Cue modules



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Translate the highlighted text in the online form into Czech. Try to achieve the best possible translation quality.

Stimulus: 2/7, Block: 6/10

Source language: English

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HELP: SKIP: NOTE

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accomodation

HOTEL **VILIN**

HOME HOTEL

TERMS & CONDITIONS

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hide note

I would like to have room with direct garden access

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- Backward translation (BT)
 - Same MT in reversed direction
- Word-level quality estimation (QE)
 - Glass-box features exploiting information from MT system
 - Projected to source by word alignment
 - Only 14-37% F-score of detecting errors
- Paraphrasing (PP)
 - Pivot translation via 41 languages
 - Grouped by similarity
- Random combination (even empty)

Example

STIM: I would like to have room with direct garden access.

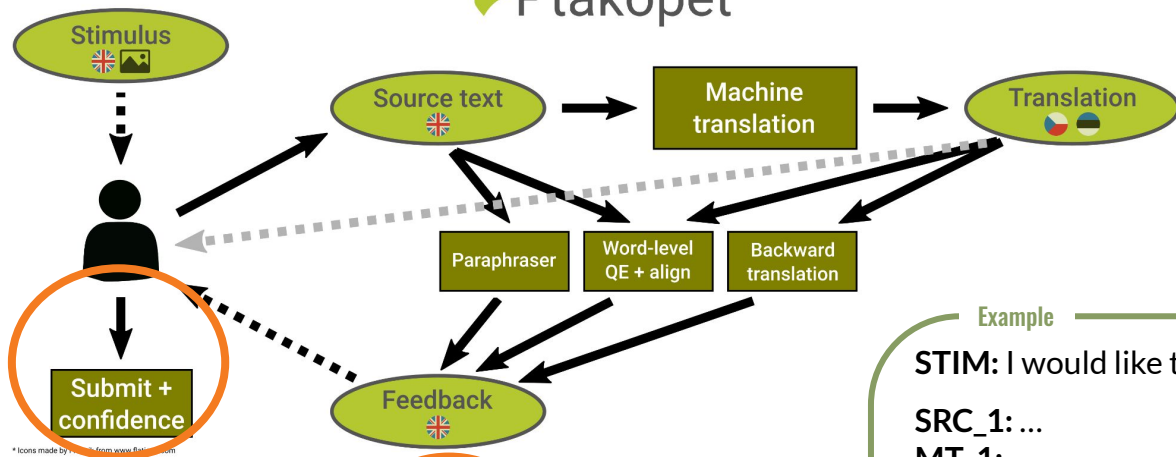
SRC: I'd like to request a room with access to the garden.

MT: Chci pokoj s přístupem do zahrady.

BT: I want a room with access to the garden.

PARAPH: I'd like to ask for a room with access to the garden.

Self-reported confidence



- How much the user believes the translation is correct
 - from 1 (least) to 5 (most)

Example

STIM: I would like to have room with direct garden access.

SRC_1: ...

MT_1: ...

BT_1: ...

PARAPH_1: ...

...

SRC_n: I'd like to request a room with access to the garden.

MT_n: Chci pokoj s přístupem do zahrady.

BT_n: I want a room with access to the garden.

PARAPH_n: I'd like to ask the room with access to the garden.

CONF: 4

The screenshot shows the online translation interface. At the top, it says "Translate the highlighted text in the online form into Czech. Try to achieve the best possible translation quality." Below this, there's a section for "accomodation" (sic) with a "HOTEL CIVILIN" header. The main text area contains the sentence "I would like to have room with direct garden access" which is highlighted in green. To the right of the text area, there's a "Stimulus: 2/7, Block: 6/10" and a "Source language: English" dropdown. Below the text area, there's a "Submit + confidence" button (circled in orange) and a "Feedback" button (also circled in orange). The interface also includes a "Terms & Conditions" section with checkboxes for agreeing to terms and not receiving marketing communication. At the bottom, there's a "Payment Method" section with a "PAYMENT UPON ARRIVAL WITHOUT GUARANTEE" option.

Experiment scene

Translate the highlighted text in the online form into Czech.
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Stimulus: 2/7, Block: 6/10

1

2

3

4


5

HELP

SKIP

NOTE

accomodation

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Experiment details

- 52 English speaking participants (49 native)
- 70 scenes with a random combination of an MT system and cue modules
- 2,486 valid scenes collected in total (48 per user on average)

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CS Student	643	42	3.66	17
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+QE	1240	49	2.86	26
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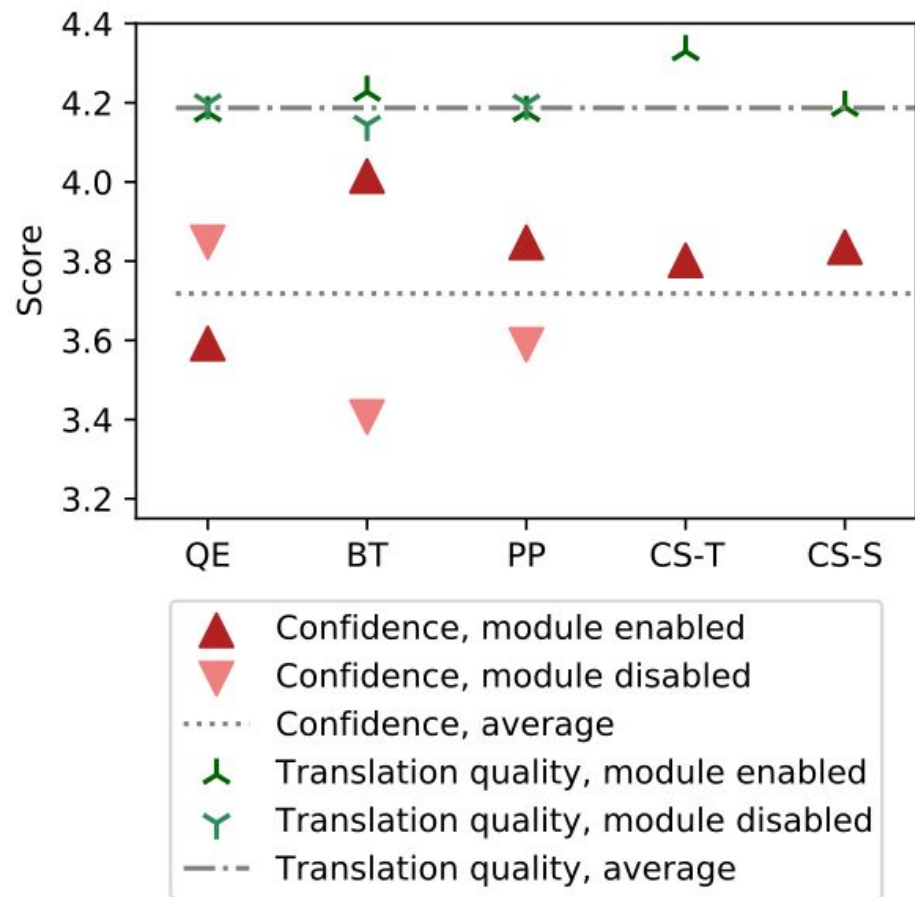
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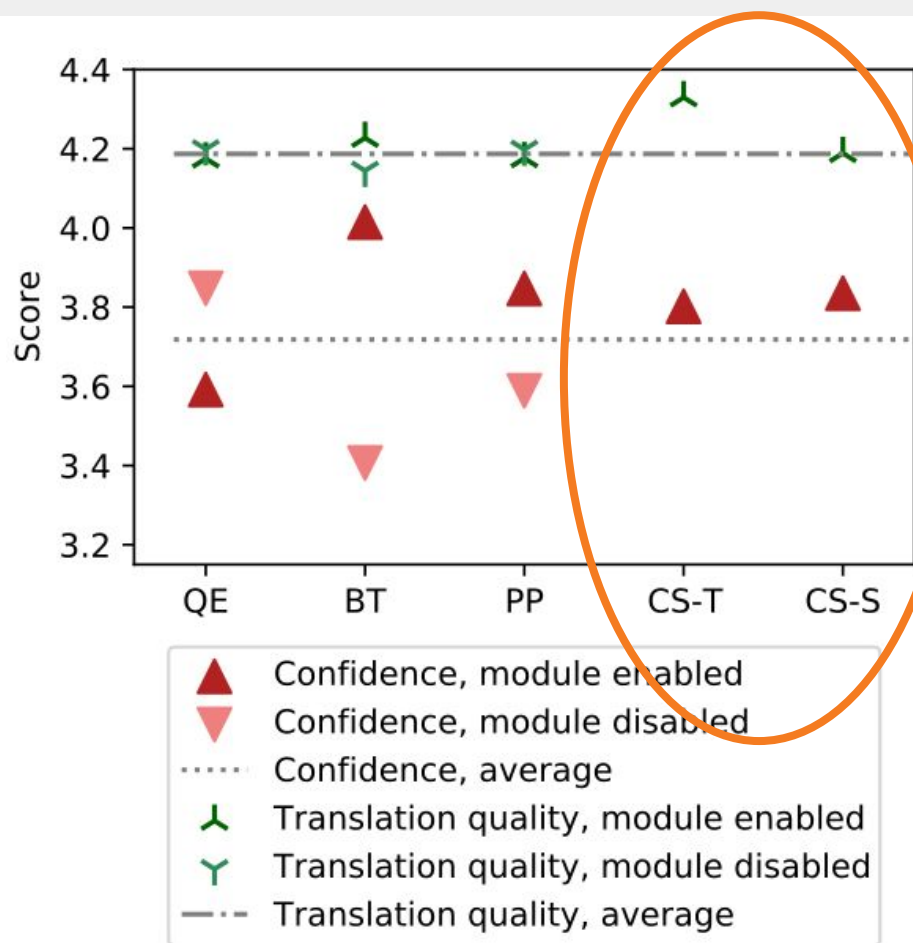
MT evaluation

- Human evaluation by 12 Czech and 3 Estonian native speakers
- Based on:
 - Source (SRC), its translation (TGT) and the corresponding stimulus (STI)
- Rating from 1 (least) to 5 (most) = the scale of self-reported confidence:
 - Overall quality
 - SRC-STI adequacy
 - TGT-SRC adequacy
 - TGT-STI adequacy
 - Fluency

Results

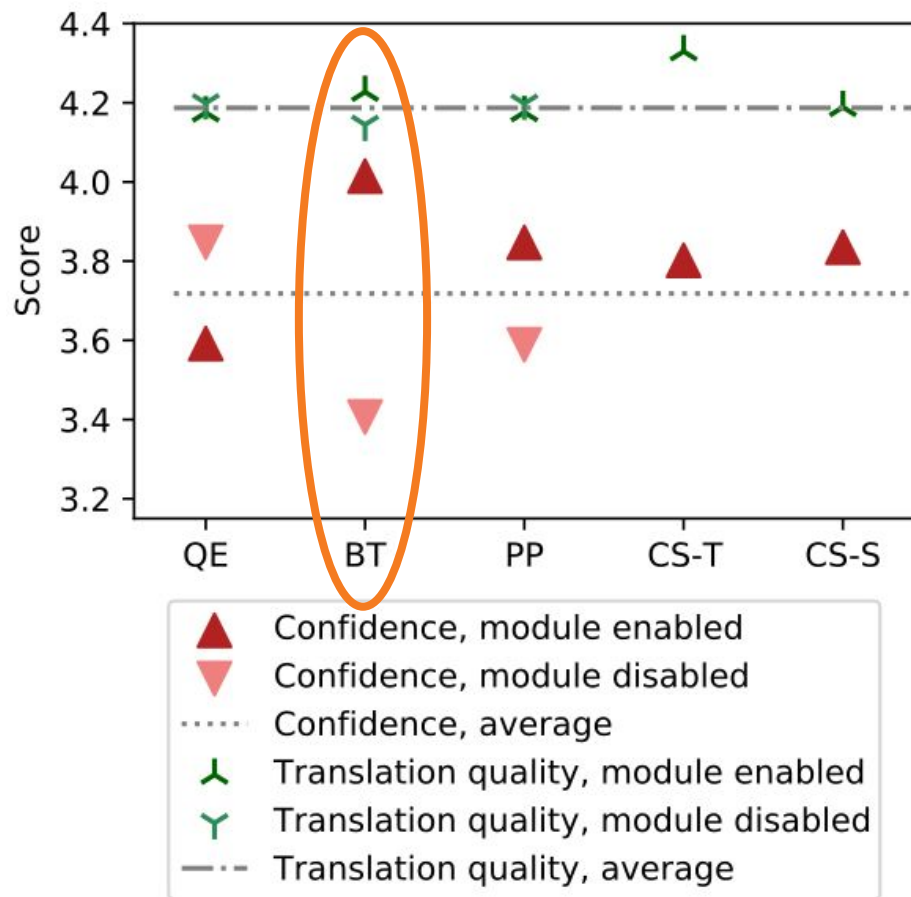


Results



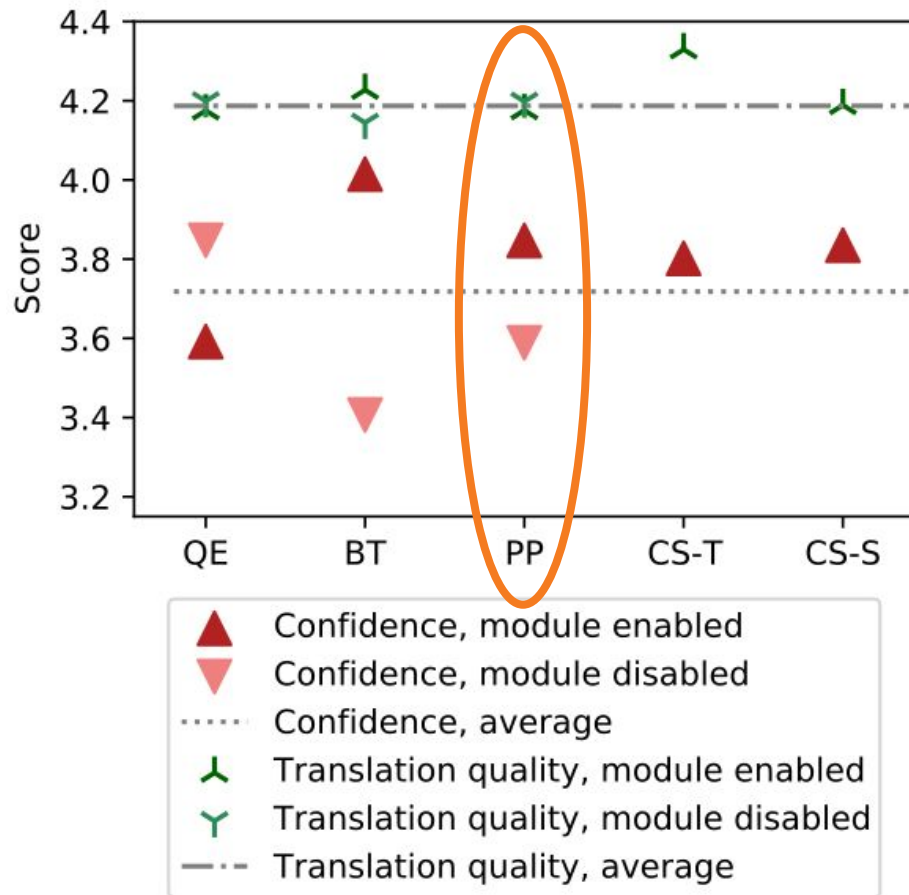
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 - Possibly high Student speed

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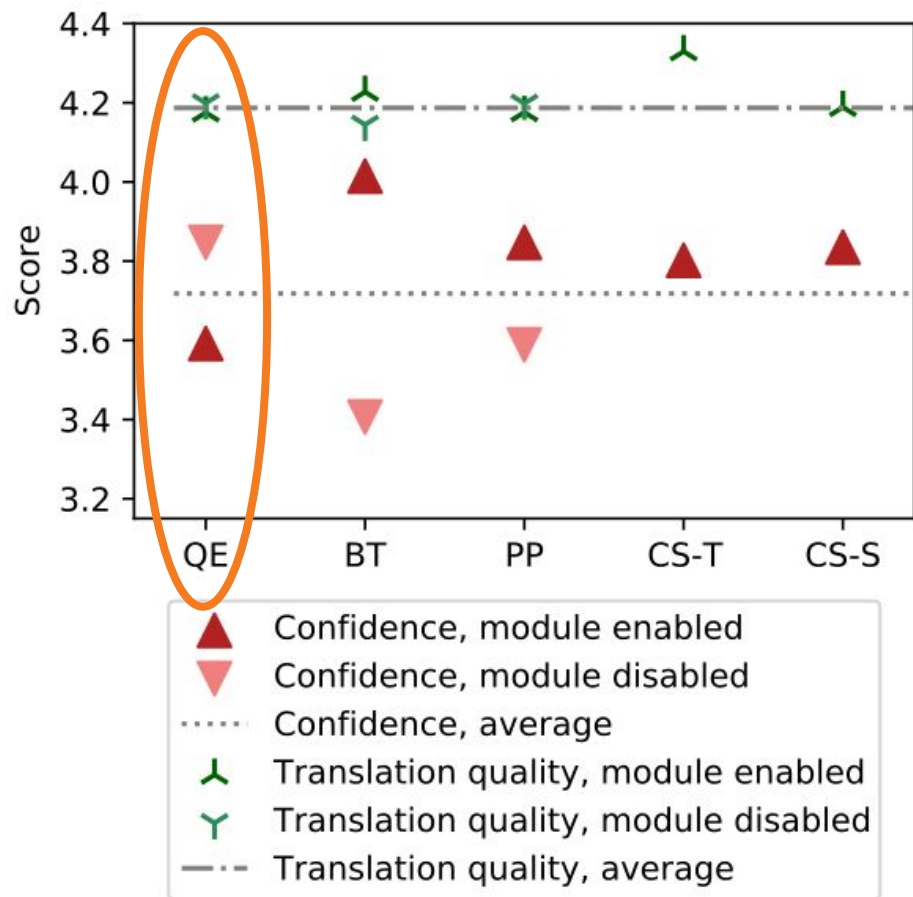
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 - Great for reassuring users

Results



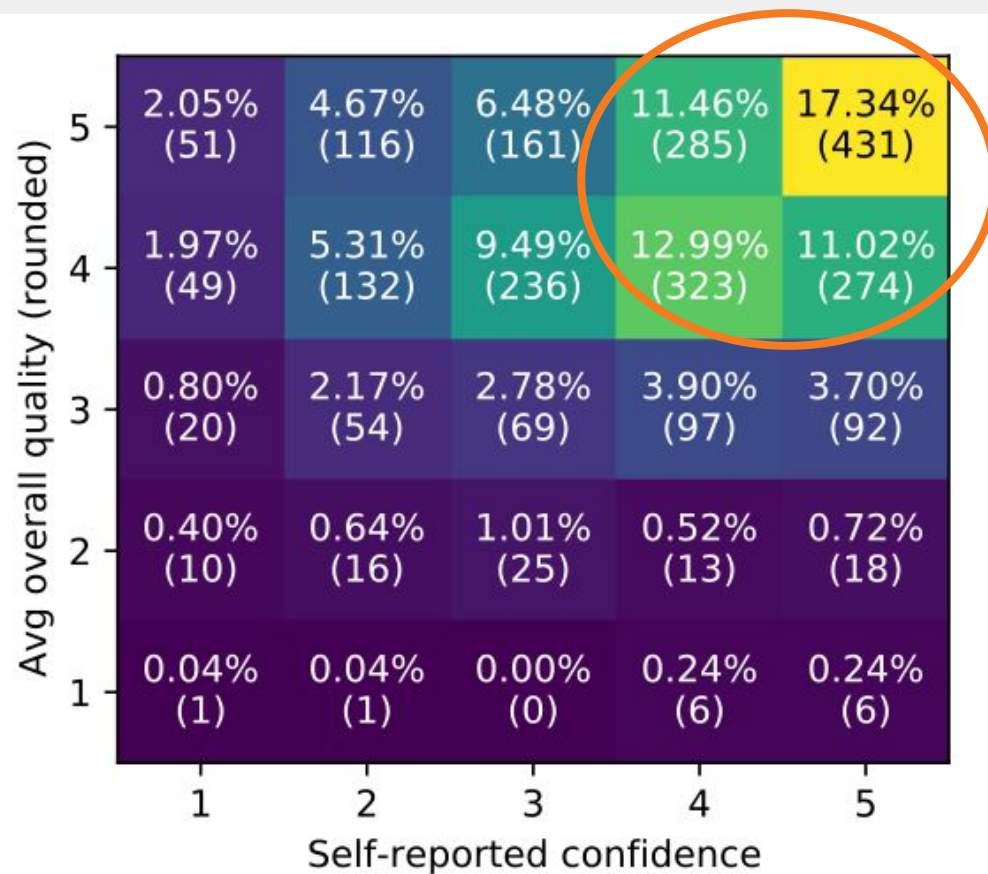
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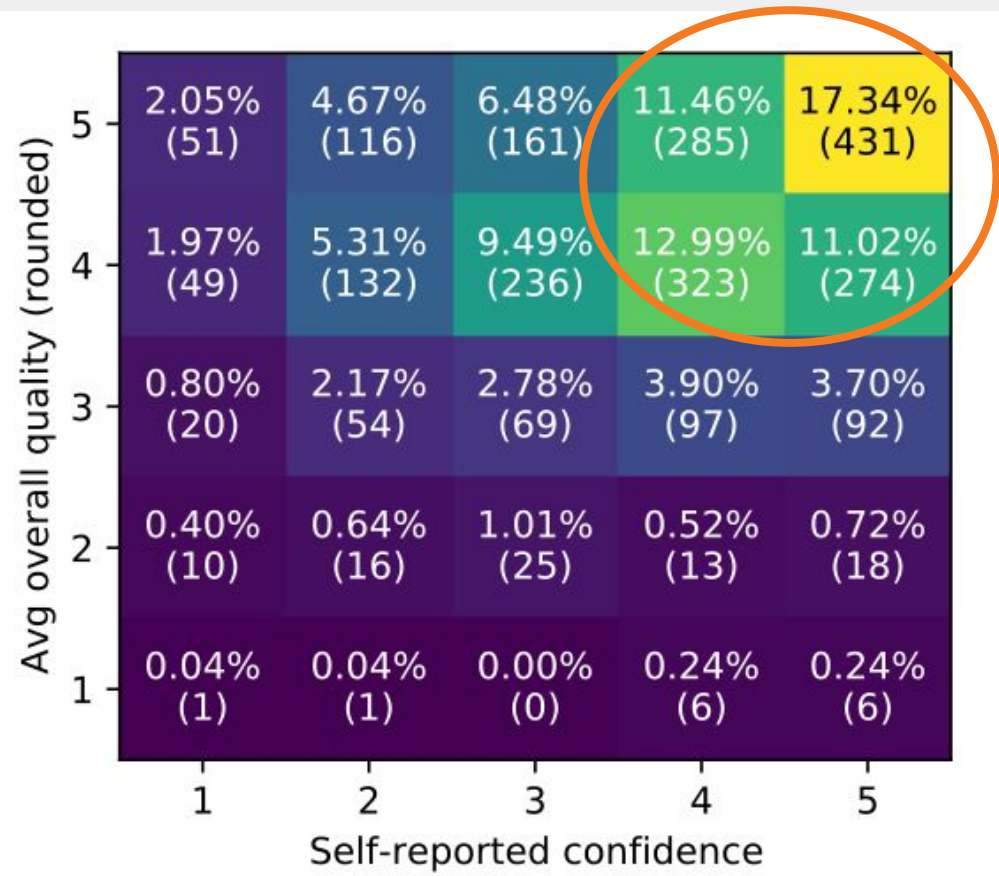
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- QE decreases confidence
 - Word-level models not mature enough for user-facing applications

Results



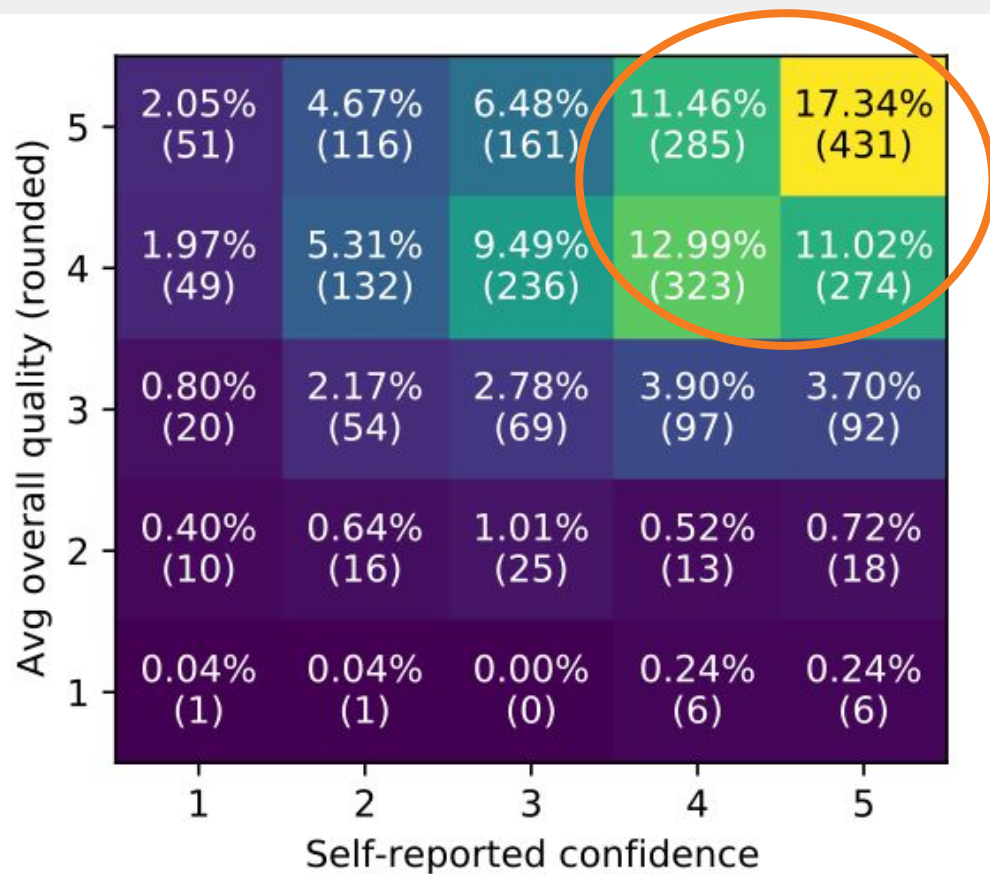
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Results



- Both confidence and quality scores cluster around the highest values
 - 63% of scenes received 4 or 5 in both scores
- Positive in terms of industry progress, yet harder to analyze
- Could be mitigated by:
 - Much lower-resourced language pairs
 - More complex queries to translate

Examples

Inter	I teach my son English with the 'Learning Time with Timmy' series on Youtube. Učím svého syna Angličana / <i>Englishman</i> / se seriálem „Learning Time with Timmy“ na Youtube.
Final	I teach my son English language with the series 'Learning Time with Timmy' series on Youtube. Učím svého syna anglický jazyk se seriálem „Learning Time with Timmy“ na Youtube.
Inter	Why was I not able to make a payment by mobile? Proč jsem nemohl zaplatit za / <i>for</i> / mobil?
Final	Why was I not able to make a payment from my mobile? Proč jsem nemohl zaplatit z mobilu?
Inter	What documents do I need to have if my ID has expired ? Jaké doklady potřebuji, když mi vypršel průkaz totožnosti?
Final	What documents do I need to have if my ID is out of date ? Jaké dokumenty potřebuji, když je můj průkaz zastaral / <i>got obsolete</i> /?

Conclusion

- Inbound vs. Outbound MT problem definition
- Backtranslation helps in confidence
- MT system speed is important even in comparison to objective quality