Backtranslation Feedback Improves User Confidence in MT, Not Quality

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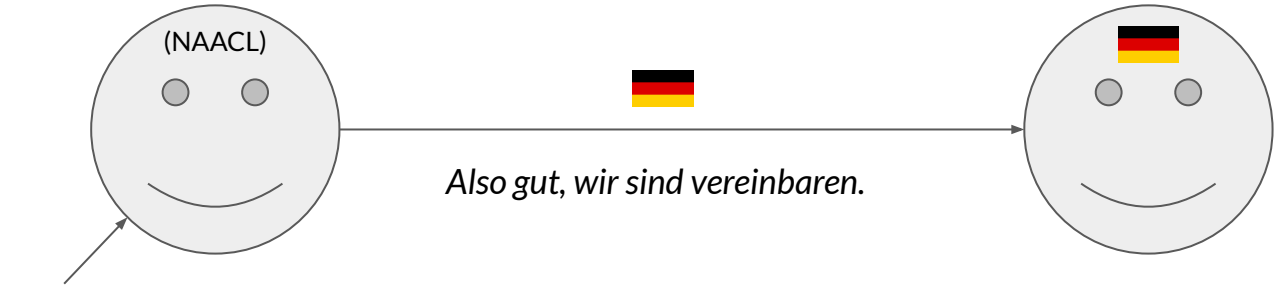
NAACL 2021

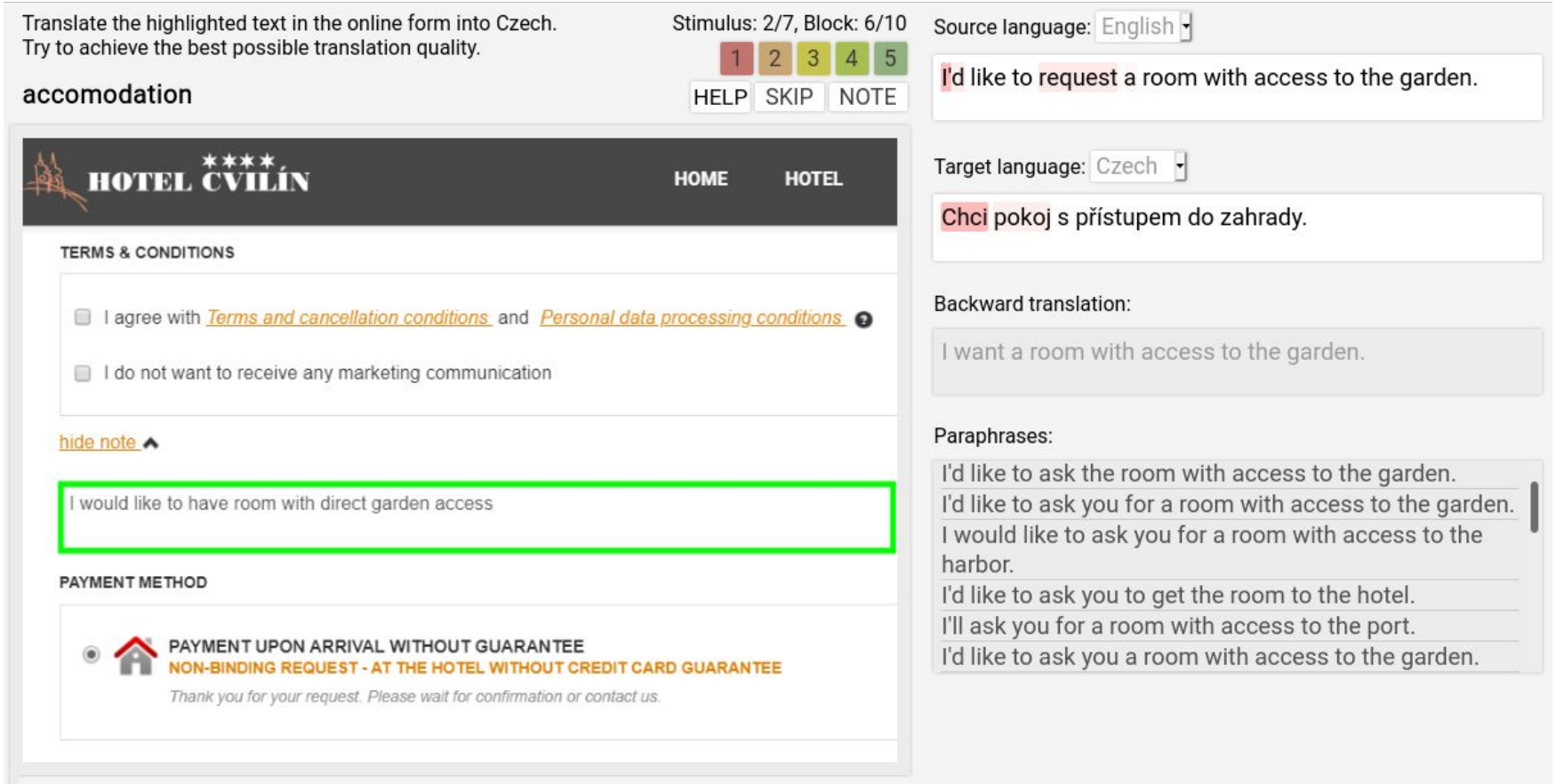
Ptakopět

bergamot

Inbound vs. Outbound Translation



Ptakopět: environment for OT experiments



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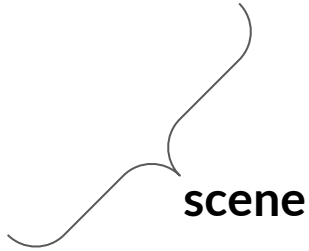

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Ptakopět

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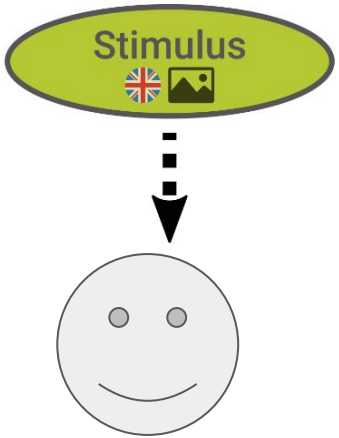

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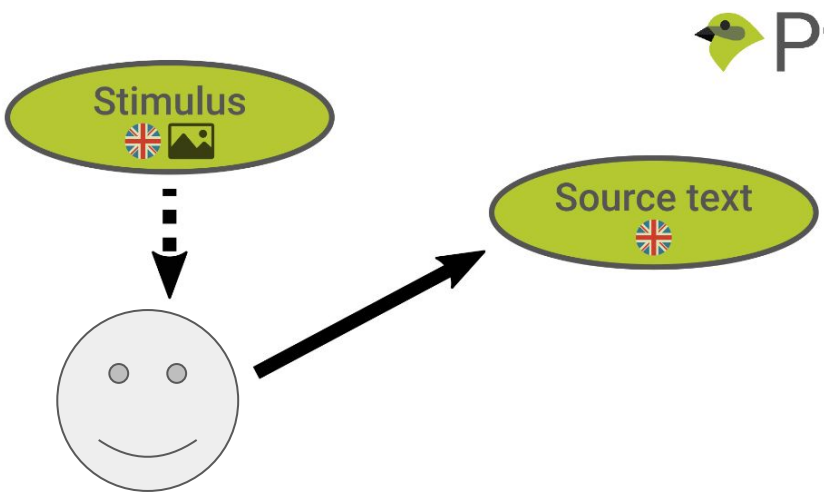

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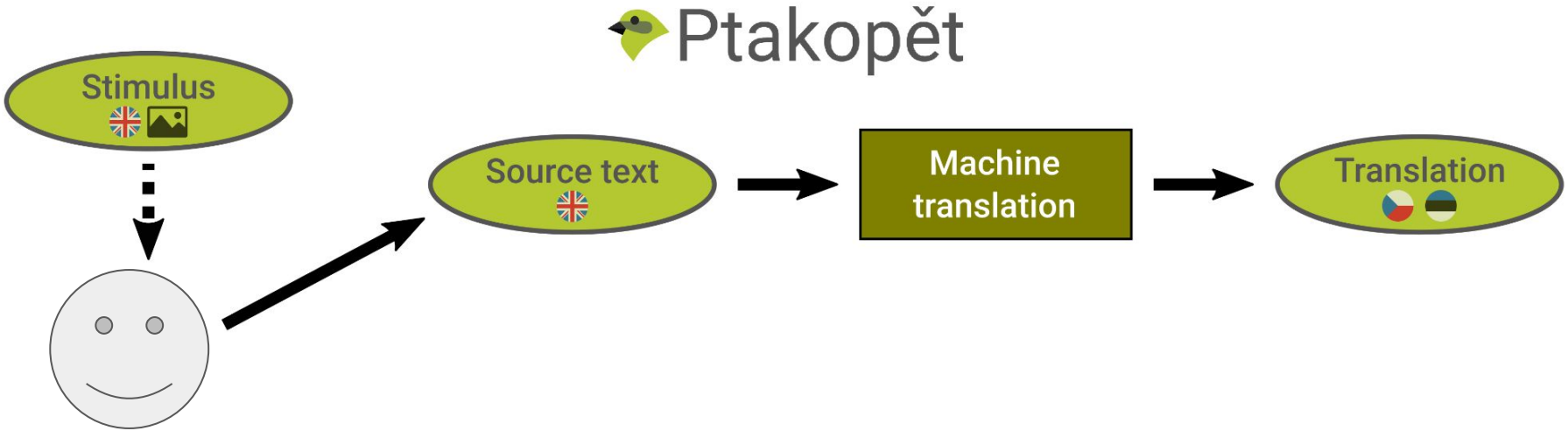

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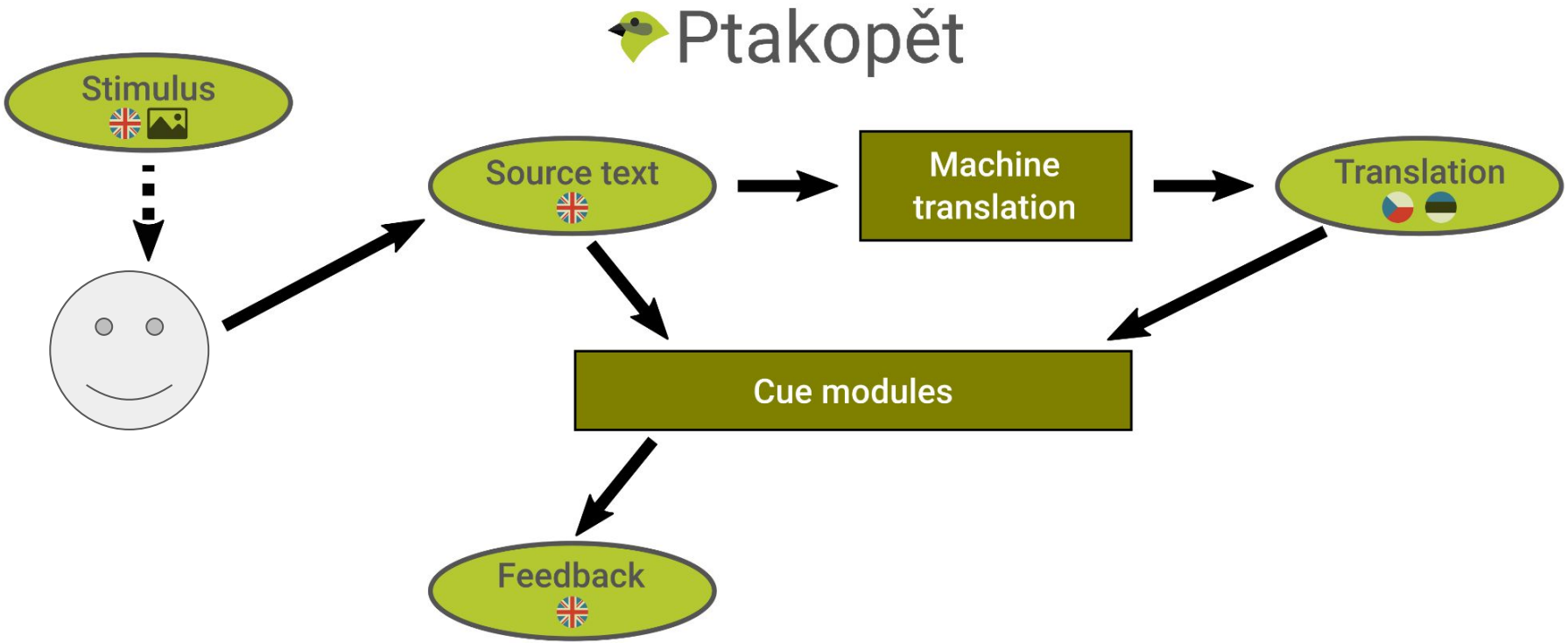

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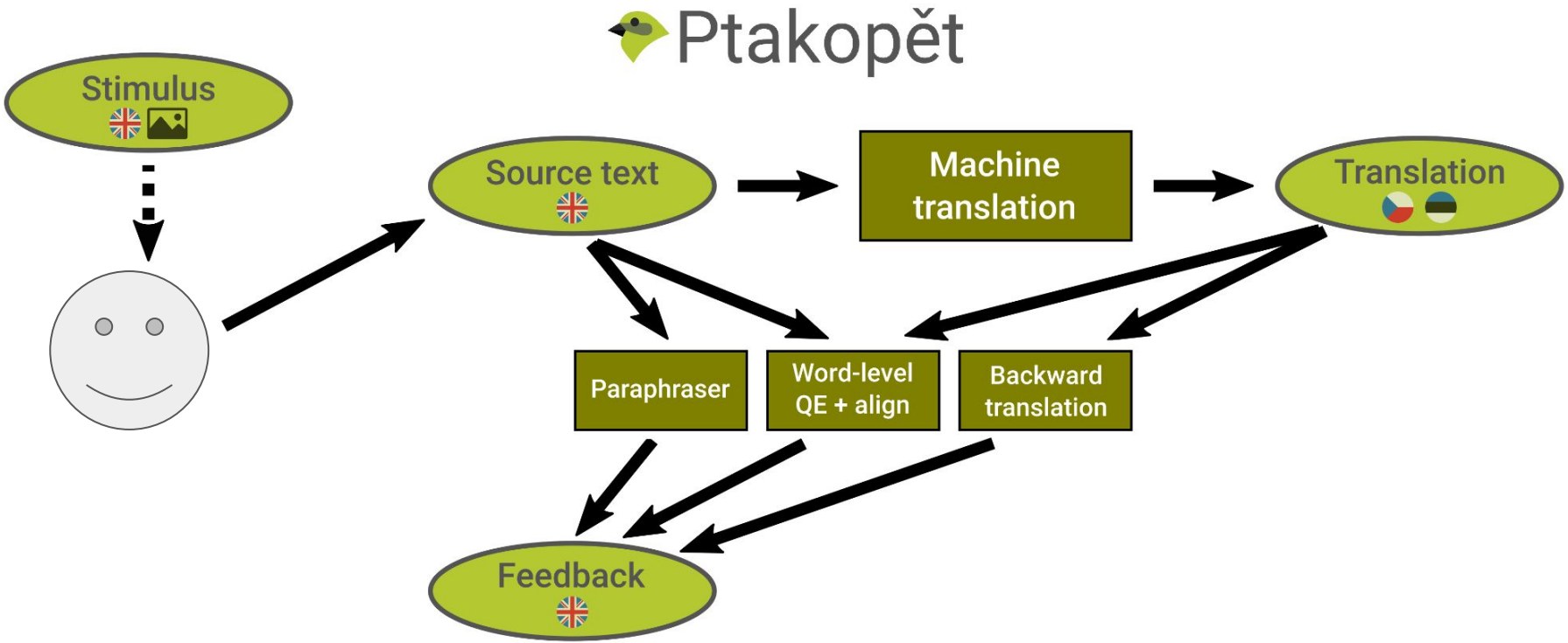

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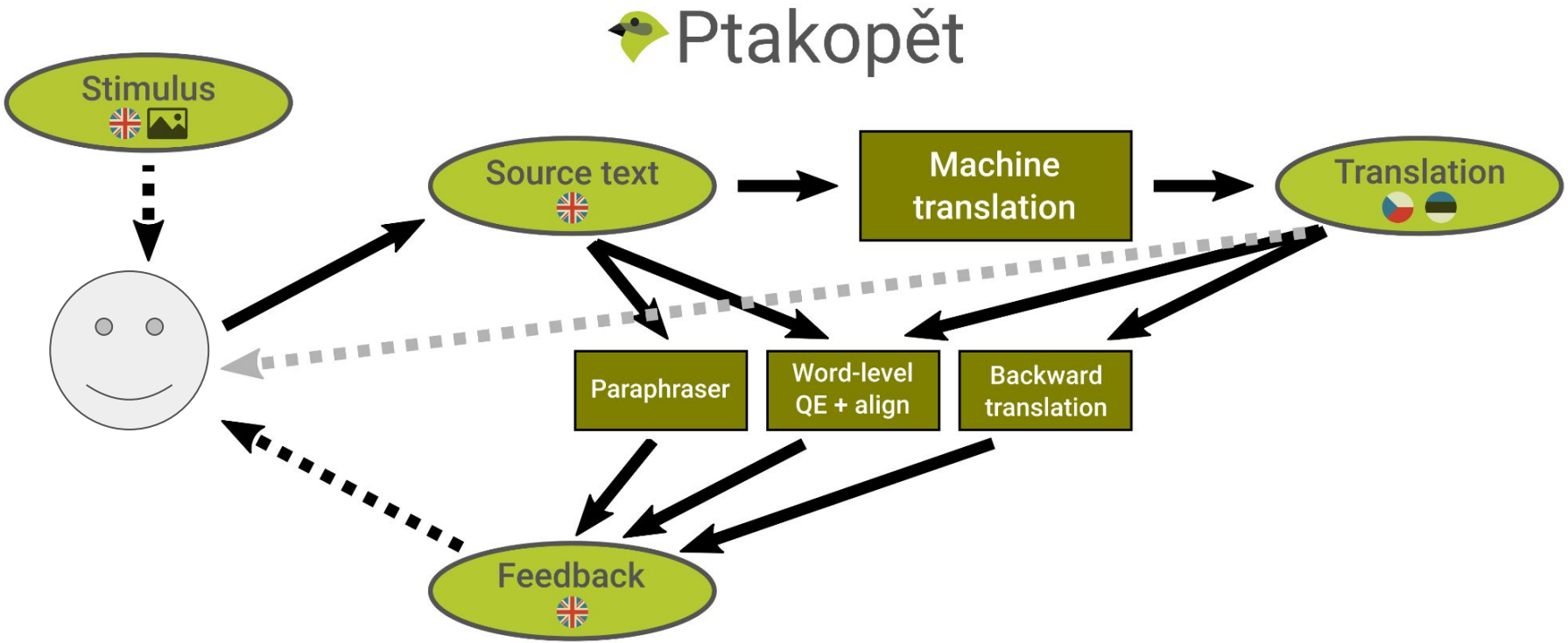

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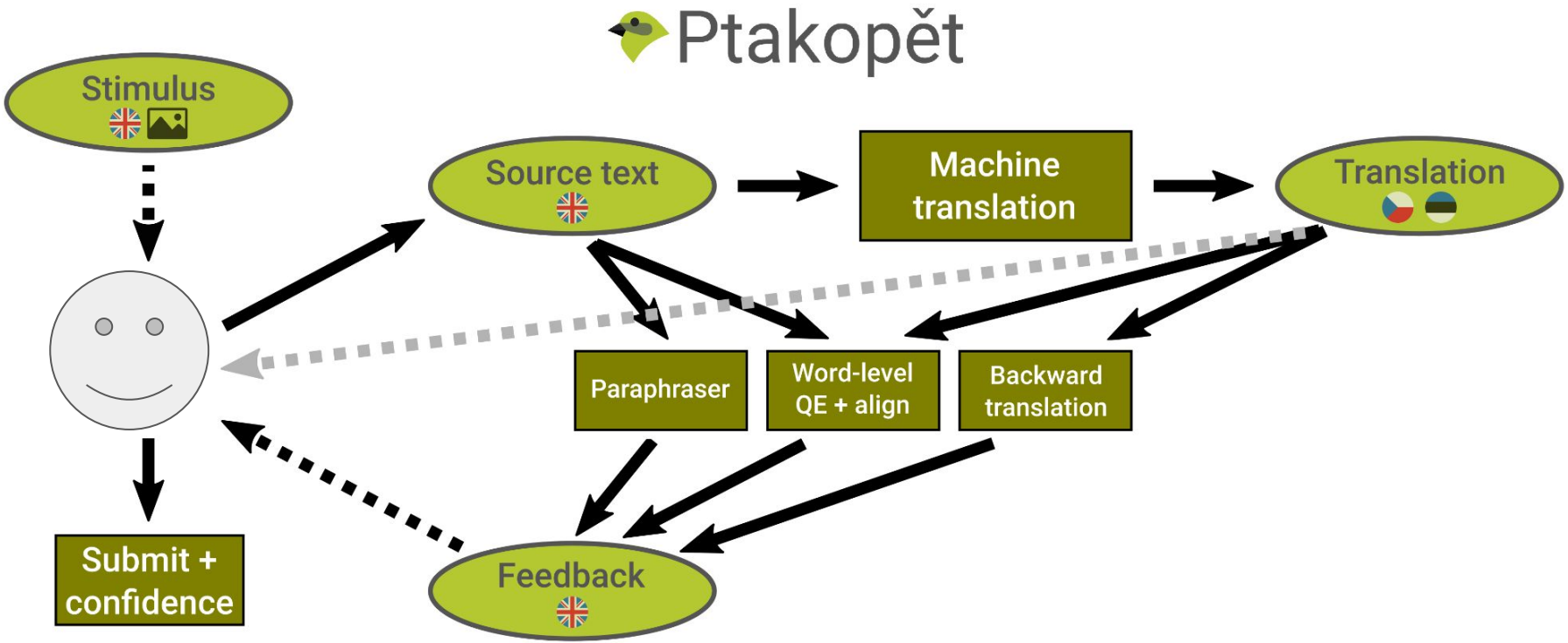

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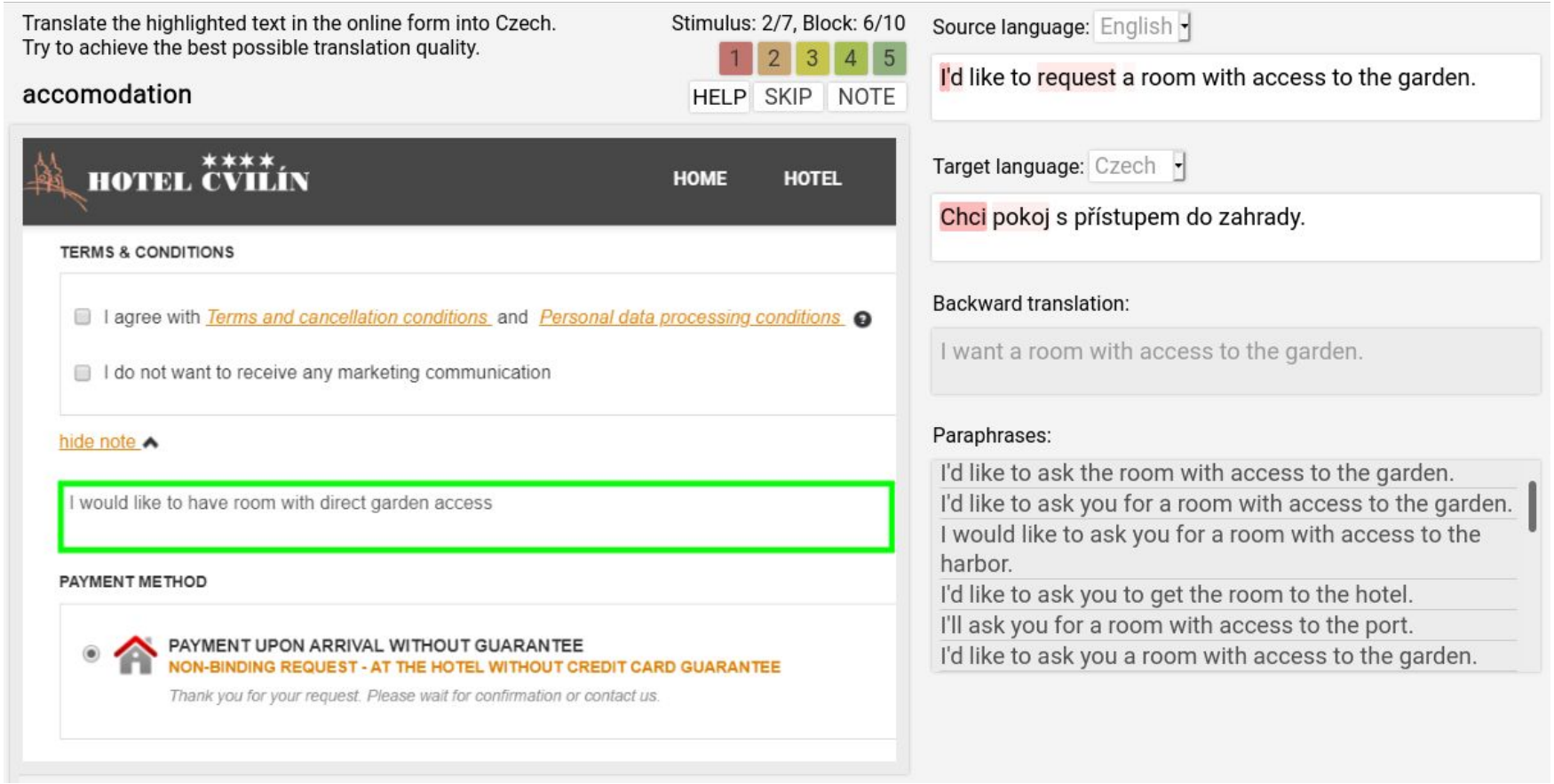
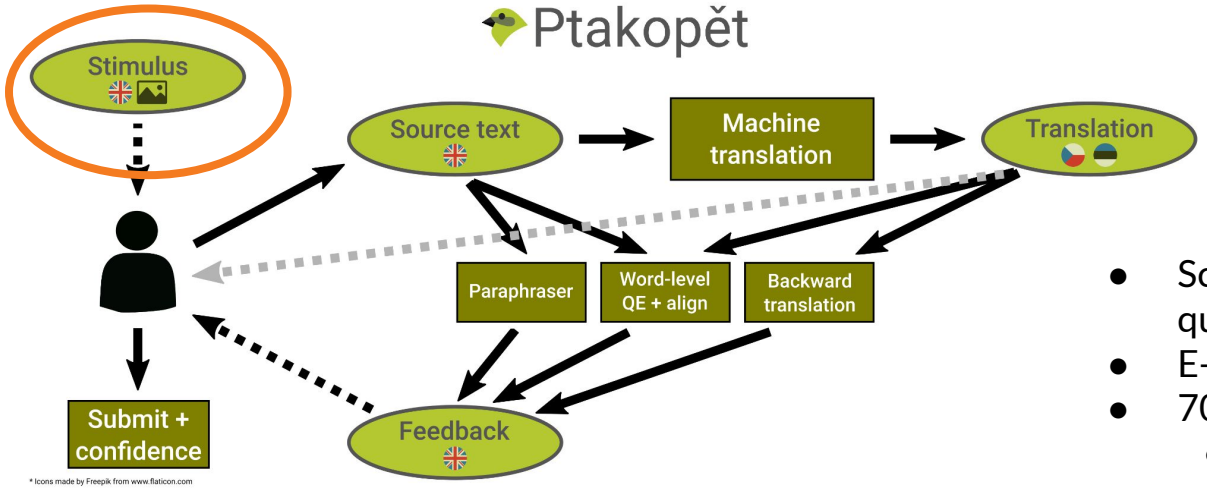
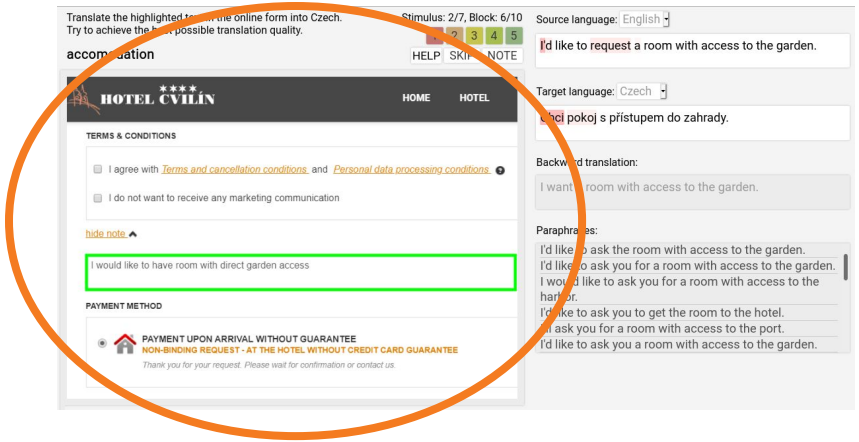


Stimuli



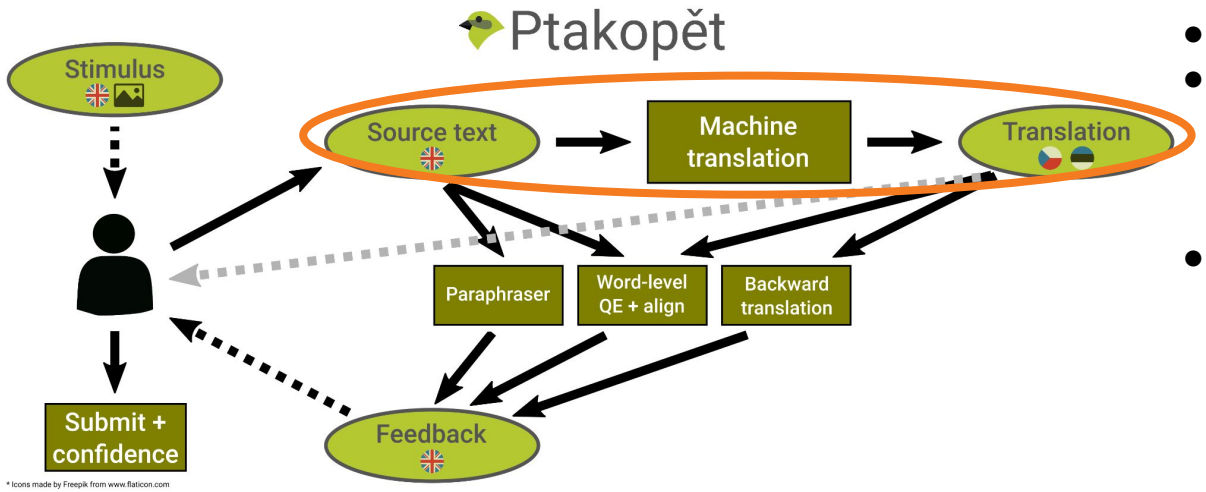


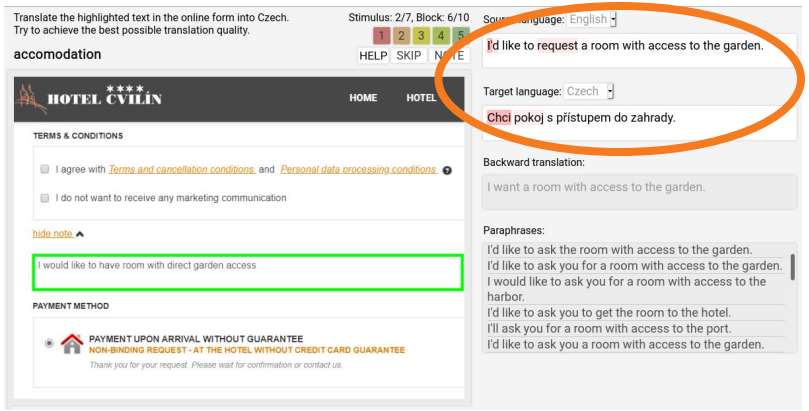
- Screenshots of web forms with a pre-filled query + website topic
- E-commerce domain
- 70 screenshots
  - Collected by 6 annotators
  - Annotators looked for web forms that contain fields to be filled with a text that requires translation

Example

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

Machine Translation



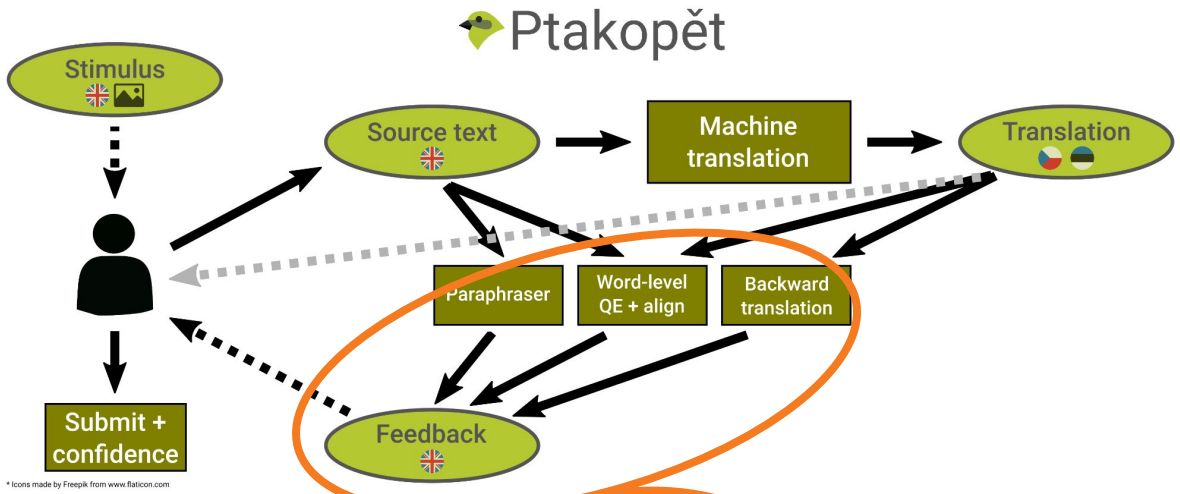


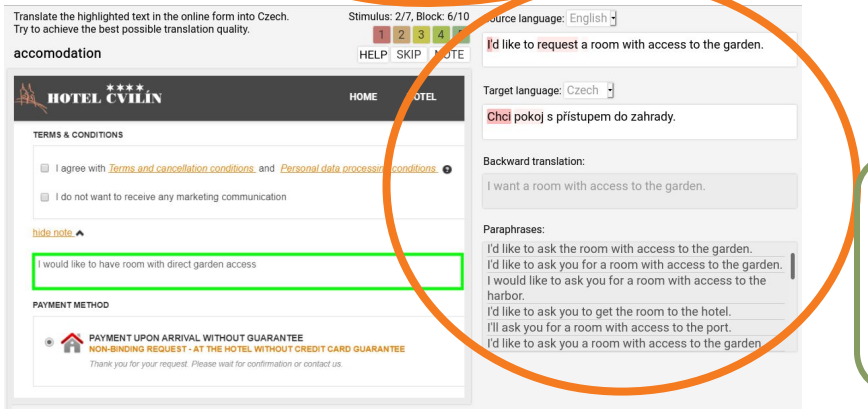
- Transformer-based models
- Czech Teacher (Czech 3)
  - Winning CS-EN system at WMT'19 News Translation Shared Task
- Czech Student (Czech 2)
  - CPU-optimized student created by knowledge distillation using Teacher
  - Much faster
  - Worse by 0.5-3.0 BLEU
- Czech weak teacher (Czech 1)
- Estonian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



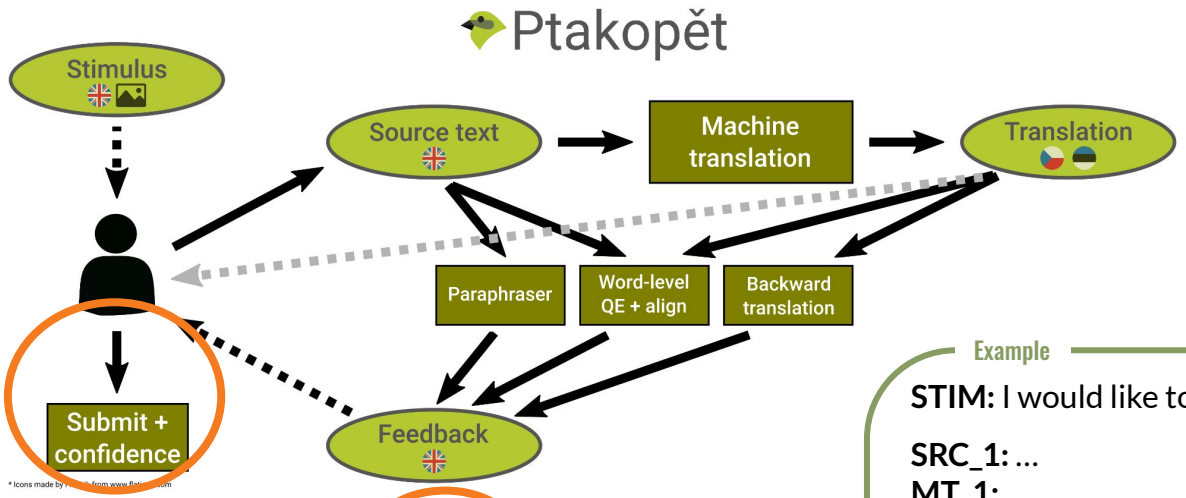


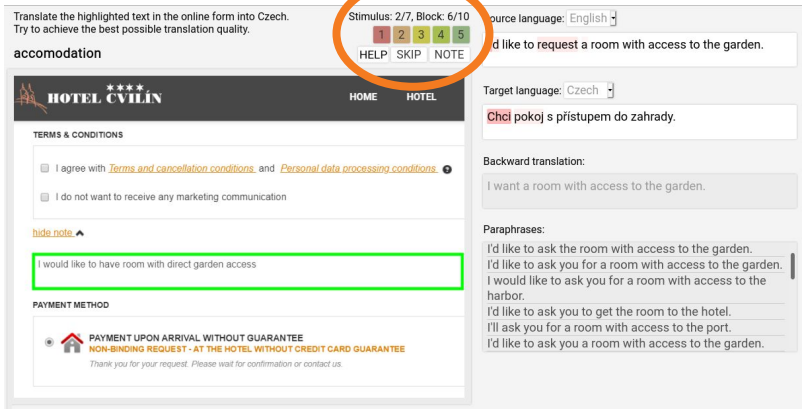
- Backward translation (*BT*)
  - Same MT in reversed direction
- Word-level quality estimation (*QE*)
  - Glass-box features exploiting information from MT system
  - Projected to source by word alignment
  - Only 14-37% F-score of detecting errors
- Paraphrasing (*PP*)
  - Pivot translation via 41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

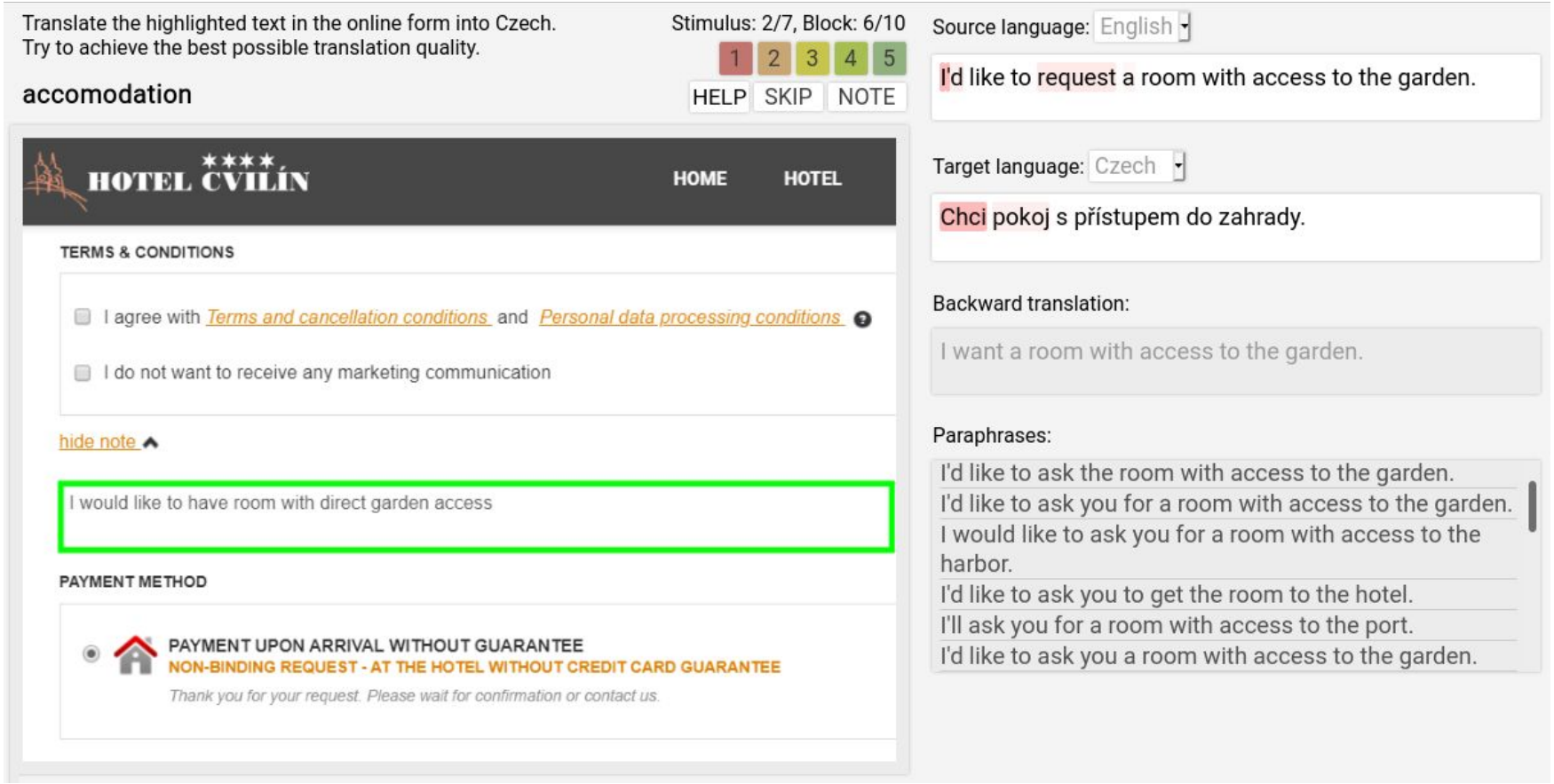
STIM: I would like to have room with direct garden access.

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

Experiment scene



Experiment details

- 52 English speaking participants (49 native)
- 70 scenes with a random combination of an MT system and cue modules
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CS Teacher	601	52	1.66	41
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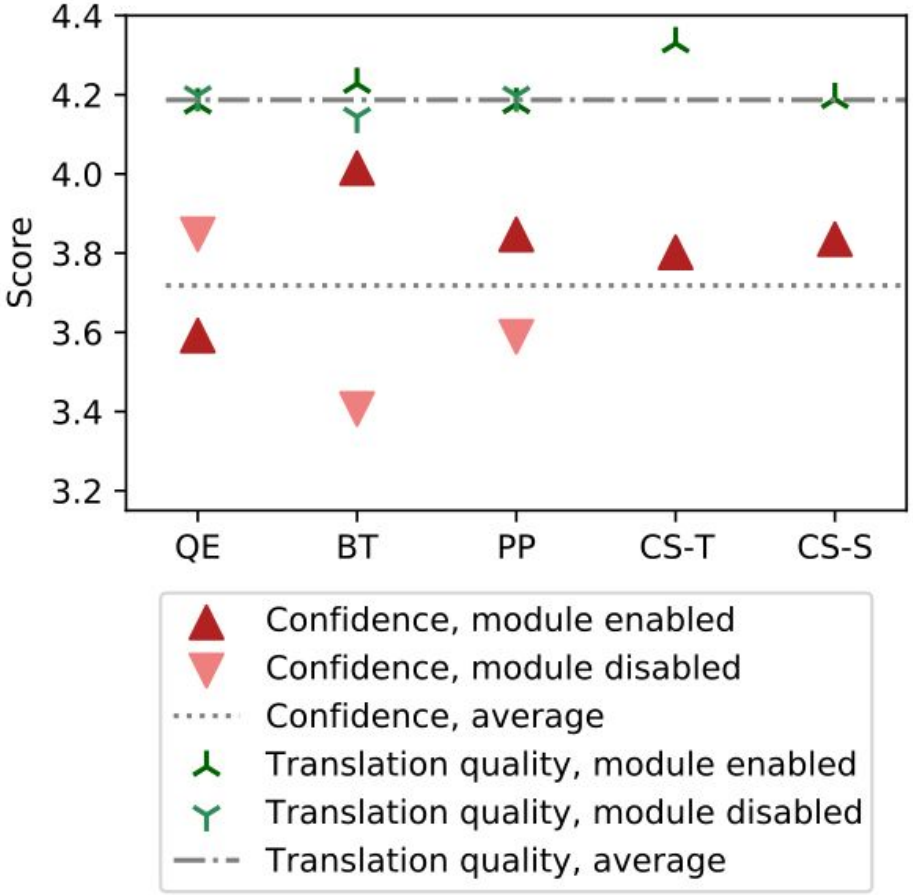
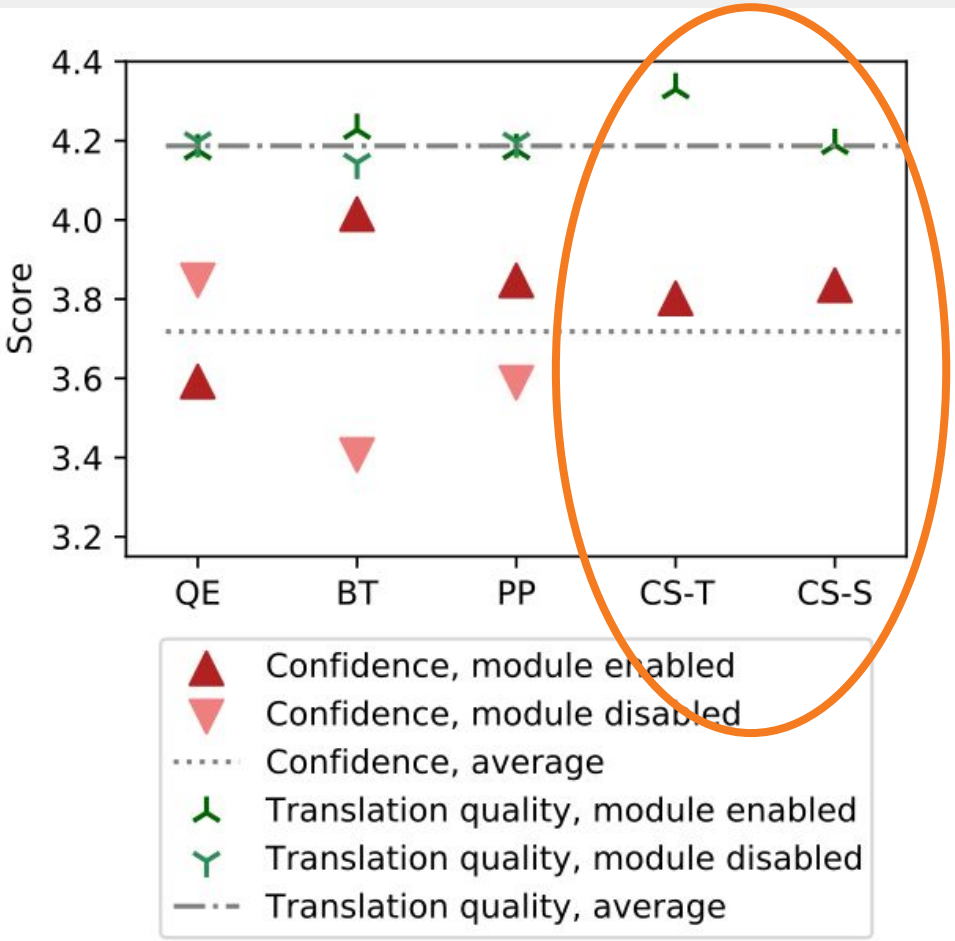
MT evaluation

- 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


4.4
4.2
4.0
3.8
3.6
3.4
3.2
Score
QE
BT
PP
CS-T
CS-S
Confidence, module enabled
Confidence, module disabled
Confidence, average
Translation quality, module enabled
Translation quality, module disabled
Translation quality, average

Results



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  - Possibly high Student speed

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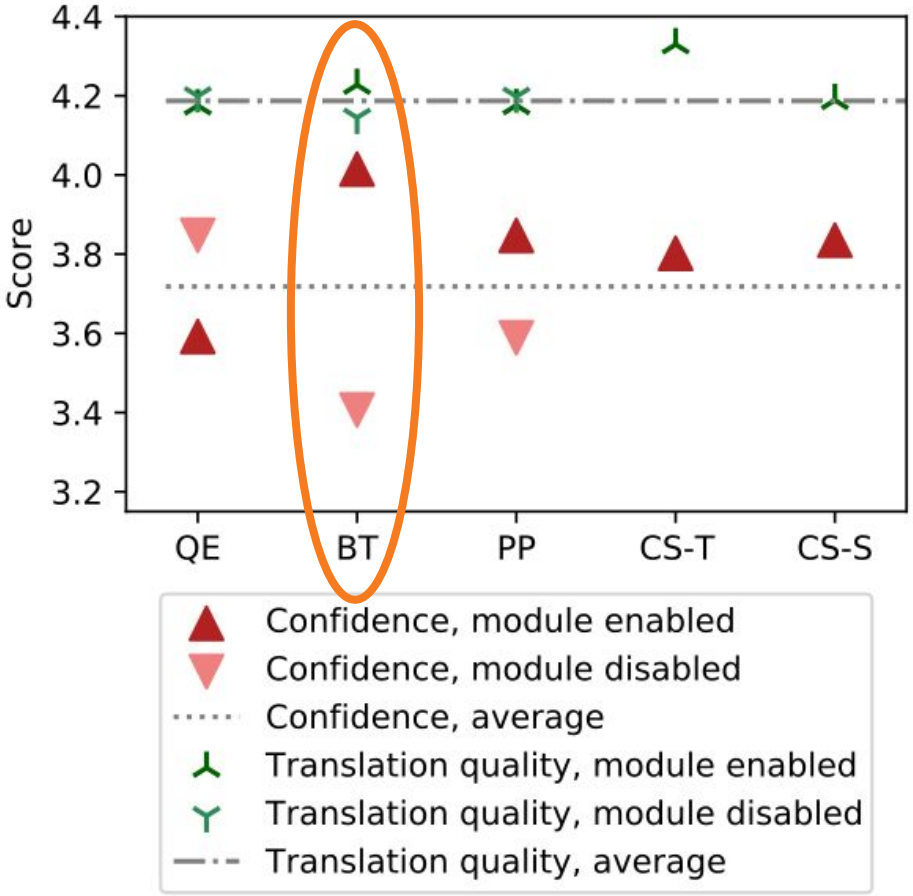

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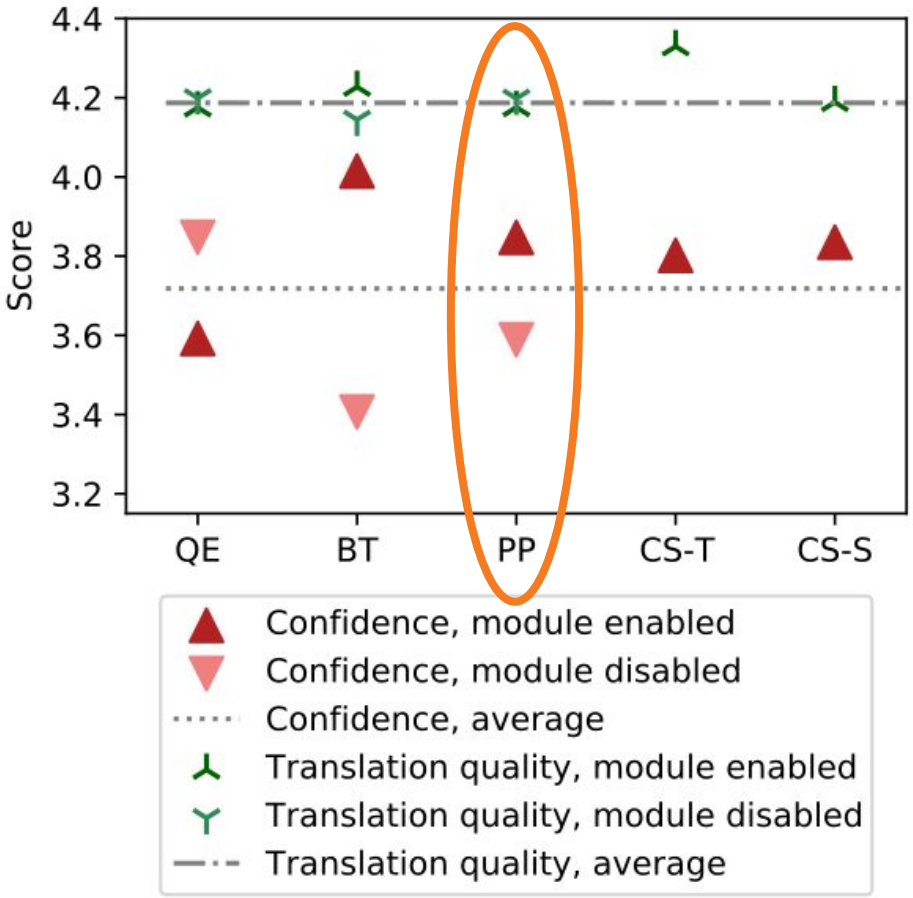

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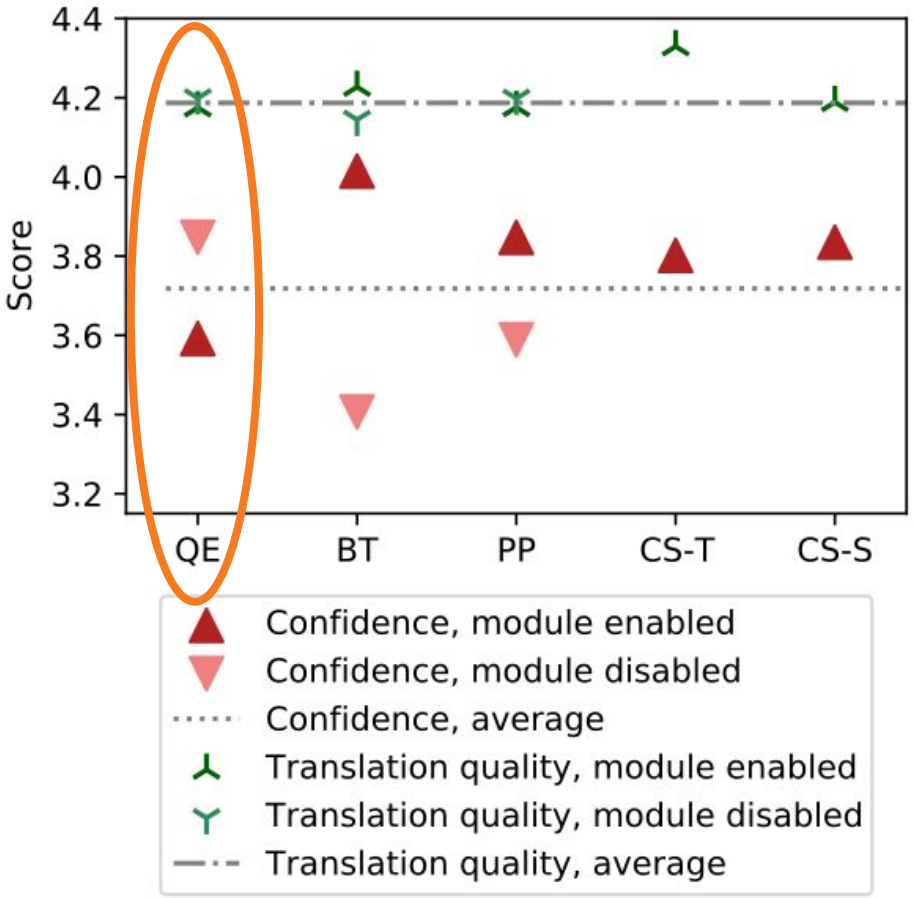

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- QE decreases confidence
  - Word-level models not mature enough for user-facing applications

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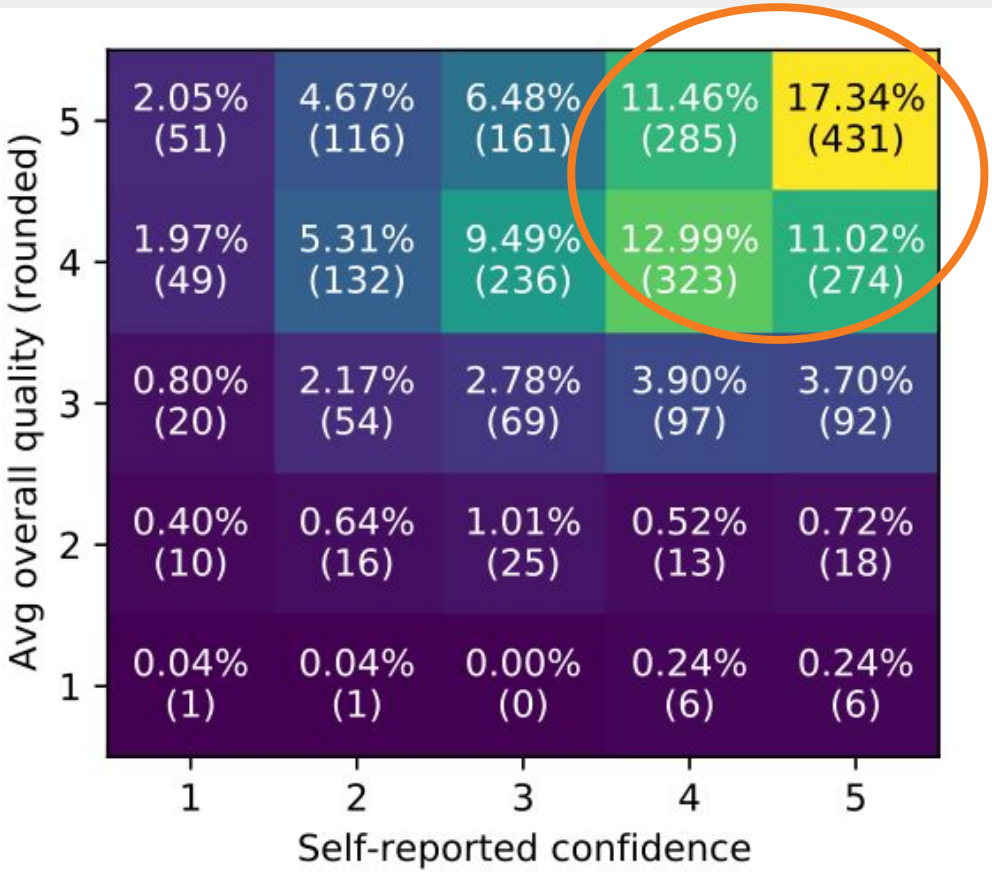

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  - 63% of scenes received 4 or 5 in both scores

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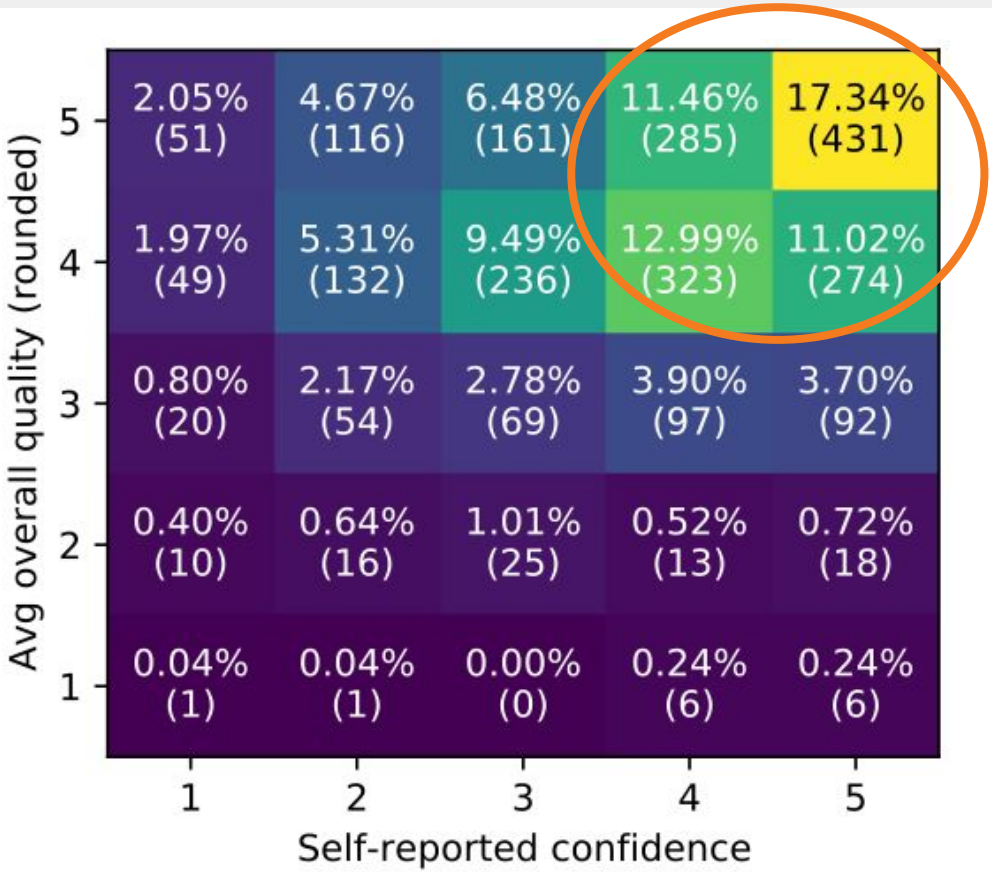

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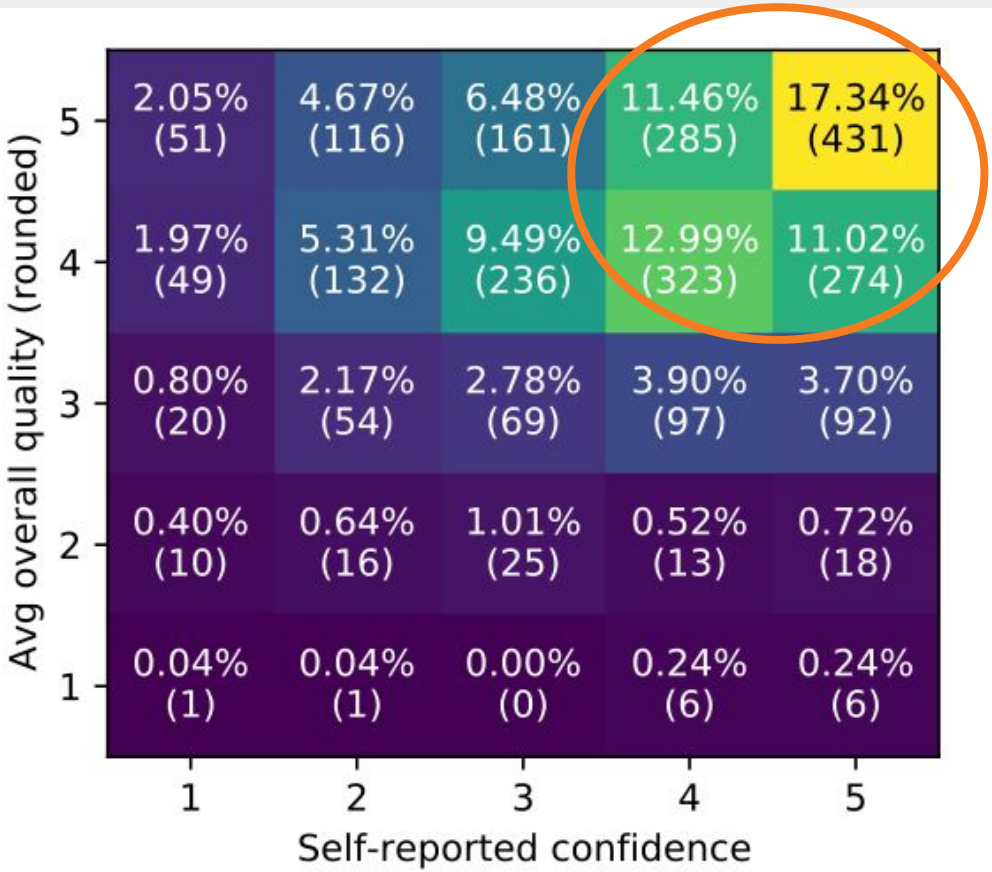

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  - 63% of scenes received 4 or 5 in both scores
- Positive in terms of industry progress, yet harder to analyze
- Could be mitigated by:
  - Much lower-resourced language pairs
  - More complex queries to translate

Examples

Inter	I teach my son **English** with the 'Learning Time with Timmy' series on Youtube.
	Učím svého syna **Angličana** */Englishman/* 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** */for/* 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** */got obsolete/*?

Conclusion

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