

Neural Machine Translation for Increased Human Translation Efficiency at Migros Bank

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Business Case



Balance Sheet Total

44.7

Billion CHF

Annual Profit

204

Million CHF

Customers

801'500

Employees (FTE)

1'344

Branches

67

Standard & Poor's
Rating

A

Need for Translation

- Translation is vital (and in some areas required by law) in multilingual markets.
- In Switzerland, a translated page of text costs between CHF 50 and 115 when purchased from a language services provider (LSP).

Translation at Migros Bank – 2016

- Translation of ~6,000 standard pages per year
- German to French and Italian (CH variants)
- Completely outsourced to a language services provider (LSP)
- Decision to build up an in-house translation team (insourcing)

Reasons for Insourcing

- Cost saving through internal translation
- Improved quality
- Accelerated translation

Translation at Migros Bank – 2017

- In-house translation team with 2.8 FTEs
- Introduction of “CAT tool” (translation memory, termbases)
- 40% of translation volume handled by in-house team
- Goal: Increase volume handled by in-house team
- Decision: Use machine translation to increase translator productivity

Problem: Data Privacy

«[...] you give Google a perpetual, irrevocable, worldwide, sublicensable, royalty-free, and non-exclusive license to Use content submitted, posted, or displayed to or from the APIs through your API Client. "Use" means use, host, store, modify, communicate, and publish. Before you submit content to our APIs through your API Client, you will ensure that you have the necessary rights (including the necessary rights from your end users) to grant us the license.»

Source: Google APIs Terms of Service

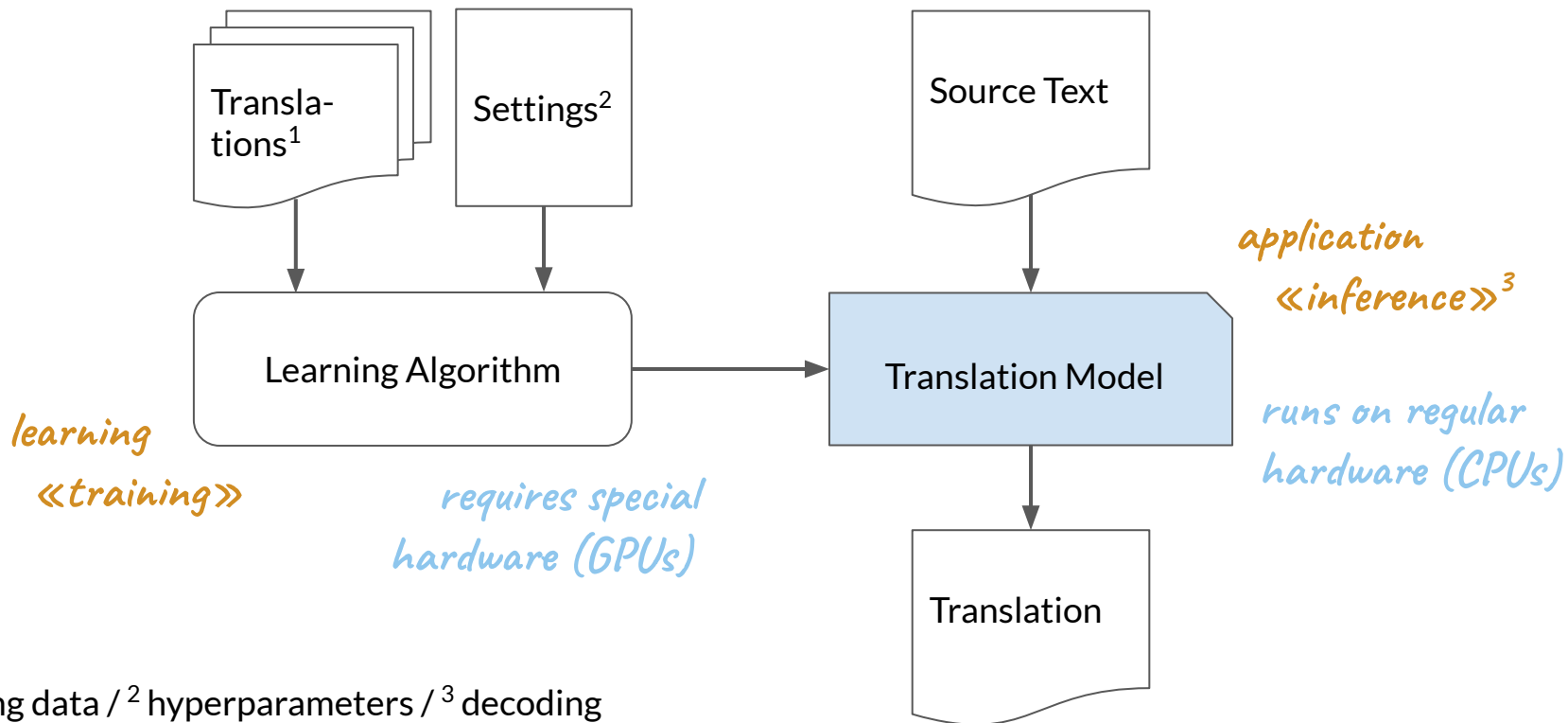
<https://developers.google.com/terms>

Requirements

- Data privacy
 - No text to leave company network
 - On-premise training and deployment
- Quality
 - Comparable to market leaders
 - Swiss language variants
 - In-house terminology
- Productivity
 - Significant time savings for in-house translation team

Technology

Neural Machine Translation



Neural Machine Translation at Migros Bank

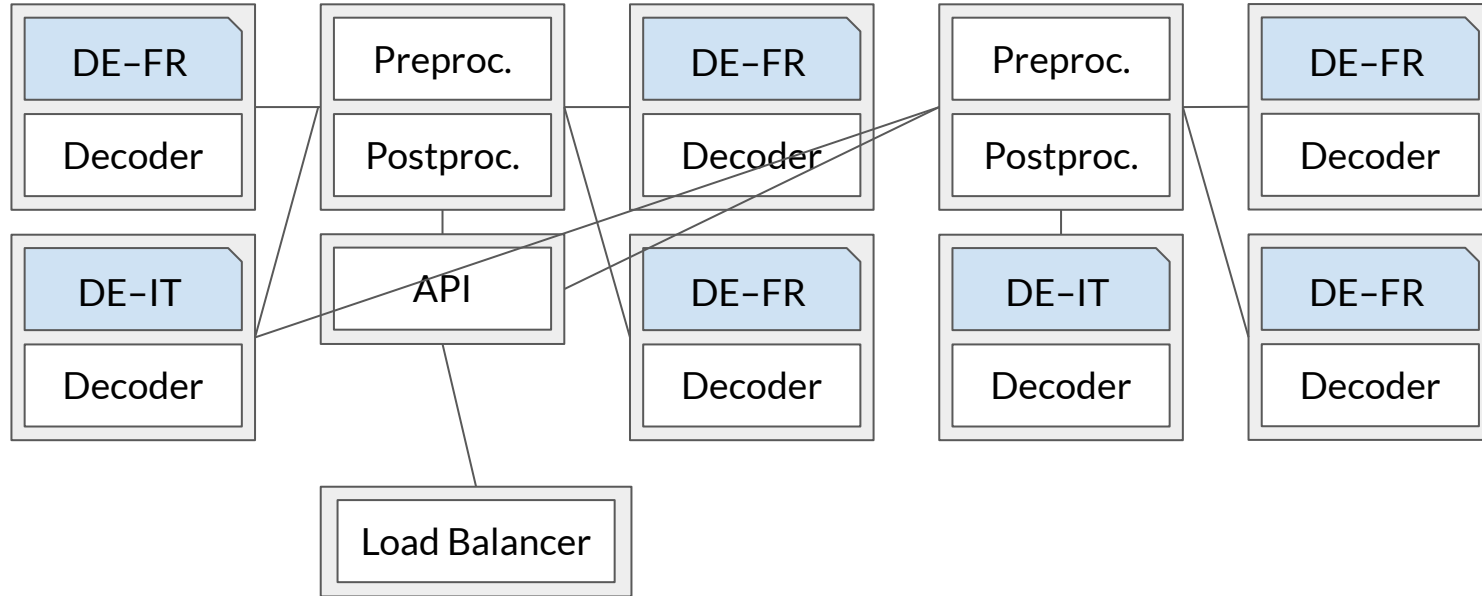
Model architecture:

- WMT17-style bi-RNN models (Sennrich et al., 2017)

Training data:

- In-domain translations (FR: 385k, IT: 187k)
- Out-of-domain translations (~6M sentences per language pair)
- Heuristic filtering (Zwahlen et al., 2016)
- Oversampling of in-domain translations

On-premise Deployment and Scalability



Quality

Evaluation of Quality

- Blind comparison with DeepL
- Initial version of DE-FR and DE-IT systems without retraining
- 400 sentences
- 4 translators per target language
- Relative ranking: A is better / B is better / equal

1%

Ausgangstext

As you can see we are standing here in front of the Shopping centre Kaufhaus Tyrol.

Wählen Sie die bessere Übersetzung oder «gleichwertig», wenn beide Übersetzungen ungefähr gleich gut sind:

A

Wie Sie sehen, stehen wir hier vor dem Kaufhaus Tirol.

X

gleichwertig

B

Wie Sie sehen können, stehen wir hier vor dem Einkaufszentrum Kaufhaus Tyrol.

WEITER

Results

System is comparable in quality to market leaders.

- 59.67% same or better than DeepL (DE-FR)
- 60.17% same or better than DeepL (DE-IT)

Productivity

How to Save Time with Machine Translation?

Ihre Abos sind so gut, dass ich sie
auf jeden Fall weiterempfehlen werde.

Machine ↓ *Machine Translation*

Their subscriptions are so good that I
will totally recommend them.

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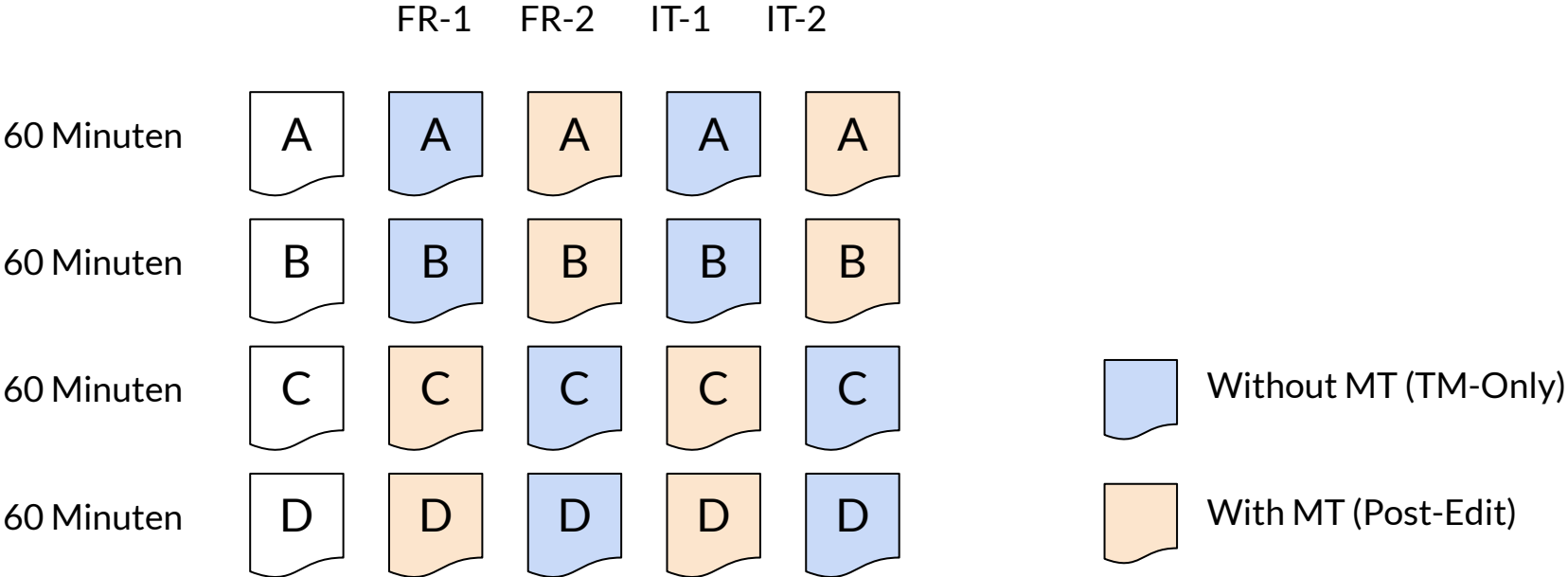
Human ↓ *Post-editing*

Your subscriptions are so good that I
will totally recommend them.

Evaluation of Translator Productivity

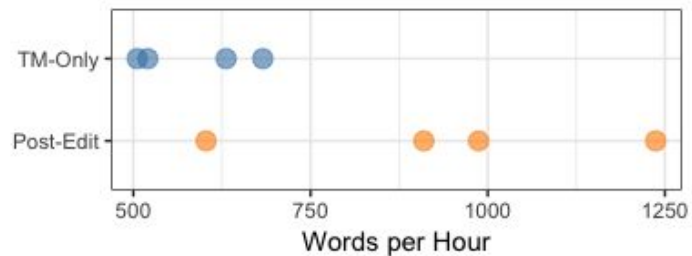
- Primary measure of interest
- MT Quality \neq translator productivity
- Evaluation in two conditions:
 - TM-Only: Regular software and translation aids
 - Post-Edit: Regular software and translation aids + machine translation
- 2 Migros Bank translators per target language
- Translators
 - had been working with the machine translation system for 3 months, and
 - had received 4 hours of post-editing training

Procedure

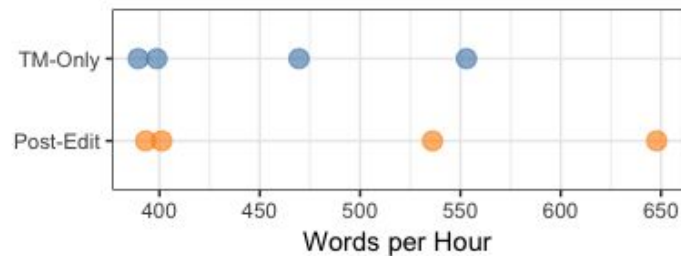


Results: Speed

German to French



German to Italian



Note: Different X axis

Results: Quality

Criterion	French		Italian	
	TM-Only	Post-Edit	TM-Only	Post-Edit
Overall Impression	4.50	4.50	4.75	4.88
Coherence	4.75	5.25	5.00	5.00
Cohesion	4.75	4.50	5.25	5.00
Grammar	4.75	4.75	4.75	4.88
Style	4.50	5.00	5.00	5.00
Cultural Adequacy	4.50	4.75	4.50	4.75

Each text scored blindly by two translation experts (ZHAW). 1 = worst, 6 = best.

Summary of Results

Measure	TM-Only	Post-Edit	Difference
Words / h	584.81	934.14	59.74 %
Quality	4.50	4.50	0.00

German to French

Measure	TM-Only	Post-Edit	Difference
Words / h	452.67	494.57	9.26 %
Quality	4.75	4.88	0.13

German to Italian

Results: Discussion

- Human translation is faster with machine translation (post-editing)
- Productivity varies between translators:
 - Some use speed-up to increase quality
 - Others use speed-up to finish jobs faster
 - Translator training in post-editing is vital
- Productivity varies between target languages:
 - DE-FR better than DE-IT system
 - Similar results when compared to DeepL
 - Less training material available (both in- and out-of-domain)

Conclusions

Conclusions

Custom machine translation systems

- are equal or better than DeepL for 60% of translated sentences;
- make human translation 35% faster.

Use at Migros Bank:

- In-house translation team now handles 60% of translation volume (vs. 40% without machine translation).
- Discounts negotiated with external service providers for remaining volume (only post-editing required).
- Quality improvements since initial evaluation through re-training

Thanks for your attention.

References

Sennrich, Rico, Alexandra Birch, Anna Currey, Ulrich Germann, Barry Haddow, Kenneth Heafield, Antonio Valerio Miceli Barone, and Philip Williams. 2017. The University of Edinburgh's Neural MT Systems for WMT17. In *Proceedings of WMT*.

Zwahlen, Alena, Olivier Carnal, and Samuel Lübli. 2016. Automatic TM Cleaning through MT and POS Tagging: Autodesk's Submission to the NLP4TM 2016 Shared Task. *arXiv 1605.05906*.