A Post-editing Interface for Immediate Adaptation in SMT

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Background & Motivation

User-adaptation in post-editing is **CRUCIAL**:

1. To overcome **domain shifts** between training data and translated materials
2. To prevent **frustrations** related to post-editing
3. To boost **efficiency** of translators and (possibly) quality

BUT:

Most adaptation approaches rely on inprecise **automatic alignment** methods

→ We present an interface to collect **user-generated phrase-alignments**, which are then used in an adaptive SMT engine

→ Our approach is evaluated in a **user study**

Repetitiveness in Patent Translation

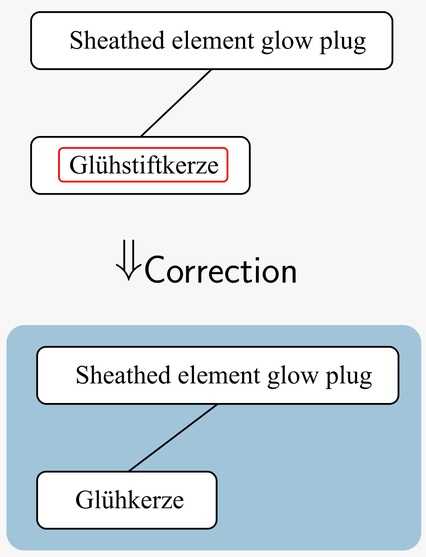
WO 2007000372 A1: Sheathed element glow plug

– A sheathed element glow plug (1) is to be placed inside a chamber (3) of an internal combustion engine.
– The sheathed element glow plug (1) comprises heating body (2) that has a glow tube (6) connected to a housing (4). ...

WO 2007031371 A1: Sheathed element glow plug

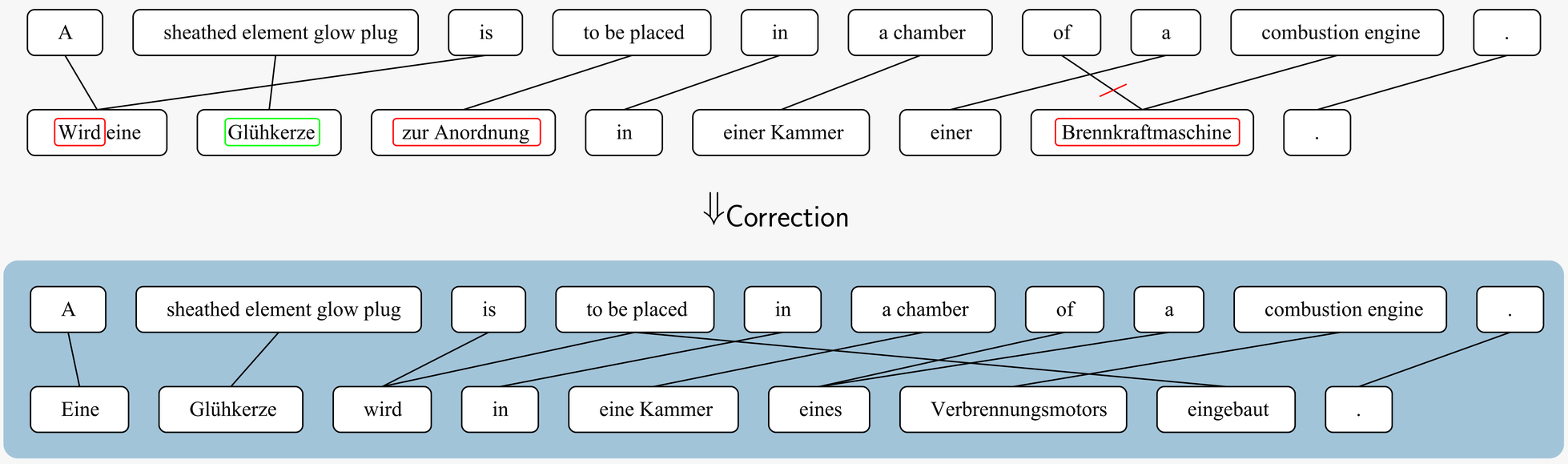
– A sheathed element glow plug (1) serves for arrangement in a chamber of an internal combustion engine.
– The sheathed element glow plug comprises a heating body ...

Example ①



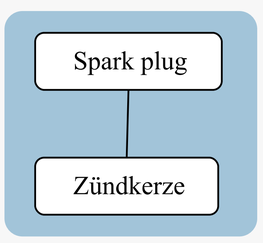
Learn:
sheathed element glow plug$_0$ → Glühkerze

Example ②

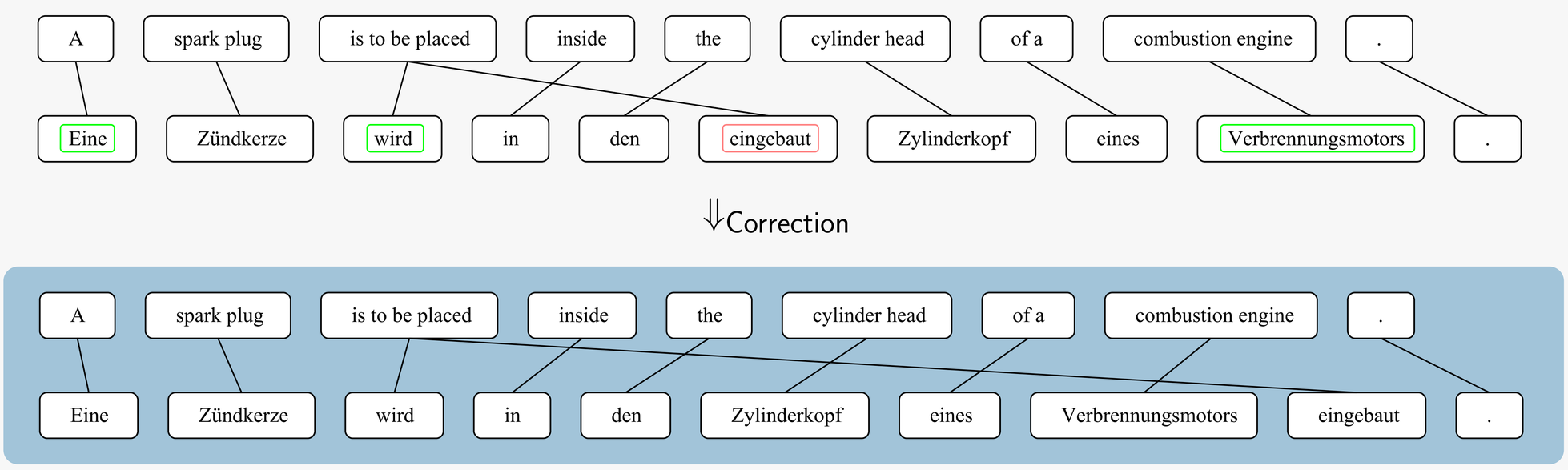


Learn:
a$_0$ → eine | is$_2$ to be placed$_3$ X_1 → wird X_1 eingebaut | a chamber$_5$ → eine Kammer | of$_6$ a$_7$ → eines | combustion engine$_8$ → Verbrennungsmotors

Example ③



Example ④



Learn: ∅

Weight Adaptation

- **Pairwise ranking updates** to weigh many sparse features
- **Per coordinate learning rates** used to prevent too harsh changes

User Study

Subjects

19 students, 13 prospective translators, 6 CS students, 4 different mother tongues

Data

Titles and abstracts of patent documents, filtered by length, clustered by similarity

Environment

Controlled environment in a computer pool, 90 minute sessions

Machine translation

Hierarchical phrase-based system built from title/abstract training data, good baseline translation results

Task

Post-edit about 500 words from English into German, each task is shared by two subjects

Results

Response Variable	estimated Δ	
HBLEU$_{+1}$	$+6.8 \pm 2.0$ [%]	$p < 0.001$
HTER	-5.3 ± 1.9 [%]	$p < 0.01$
normalized time	-118 ms	—

LMEM analysis. Estimated differences in the response variables contrasting non-adaptive to adaptive systems along with associated p-values, if $p \leq 0.05$

Conclusions

1. Novel graphical interface with phrase-alignments for a new form of interactive post-editing
2. Alignment can be used for adaptation of the translation model
3. User study shows significant reductions in manual effort and slight speed improvement

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- S. Green, J. Chuang, J. Heer, and C. D. Manning. 2014. Predictive translation memory: A mixed-initiative system for human language translation. In ACM User Interface Software & Technology.