The Features of Translationese

Between Human and Machine Translation

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Original or Translation?

Example (O or T?)

מאות אלפי אזרחים הפגינו אתמול (ראשון) בפאריס נגד הצעת החוק שמאפשרת נישואי זוגות חד-מיניים ואימוץ ילדים על ידי בני זוג מאותו מין. זוהי ההפגנה האחרונה לפני אימוץ החוק על ידי הסנאט שמתוכנן בחודש אפריל.

ההפגנה התקיימה במיקום סמלי - בין לה דפאנס לבין כיכר אטואל שבמרכזה עומד שער הניצחון.

המפגינים, בהם צעירים רבים, משפחות עם ילדים ואזרחים ותיקים, נשאו שלטים בגנות המהלך שעליהם נכתב בין השאר "רוצים עבודה, לא נישואי הומואים", "מדינת זכויות האדם מגנה על זכויות הילדים", ו"אל תיגעו בנישואים, דאגו לאבטלה".

Example (T or O?)

צרפת הפכה היום (שלישי) אחר הצהריים למדינה ה-14 בעולם המעגנת בחוק נישואים חד מיניים.

ההצבעה הסופית בבית המחוקקים היתה מהירה, מאחר שלמפלגה הסוציאליסטית של הנשיא פרנסואה הולנד, התומכת בשינוי, יש רוב ניכר בפרלמנט.

ואולם, בשבועות האחרונים גברה בצרפת המחאה נגד אישור החוק. ההפגנות גם זימנו למתנגדי הולנד בימה לתקוף את הנשיא עצמו. לדברי התקשורת הצרפתית, יו"ר האסיפה הלאומית קיבל אתמול מכתב המאיים ב"מלחמה" נגד חברי פרלמנט סוציאליסטים, אם החוק אמנם יעבור; על פי הדיווחים, המעטפה הכילה אבק שריפה.

Translationese

The language of translated texts

- Translated texts differ from original ones
- The differences do not indicate poor translation but rather a statistical phenomenon, **translationese** (Gellerstam, 1986)
- Toury (1980, 1995) defines two **laws of translation**:

  The law of interference Fingerprints of the source text that are left in the translation product

  The law of growing standardization Effort to standardize the translation product according to existing norms in the target language and culture

Translationese

The language of translated texts

Translation universals (Baker, 1993)

> *"features which typically occur in translated text rather than original utterances and which are not the result of interference from specific linguistic systems"*

simplification (Blum-Kulka and Levenston, 1978, 1983)

explicitation (Blum-Kulka, 1986)

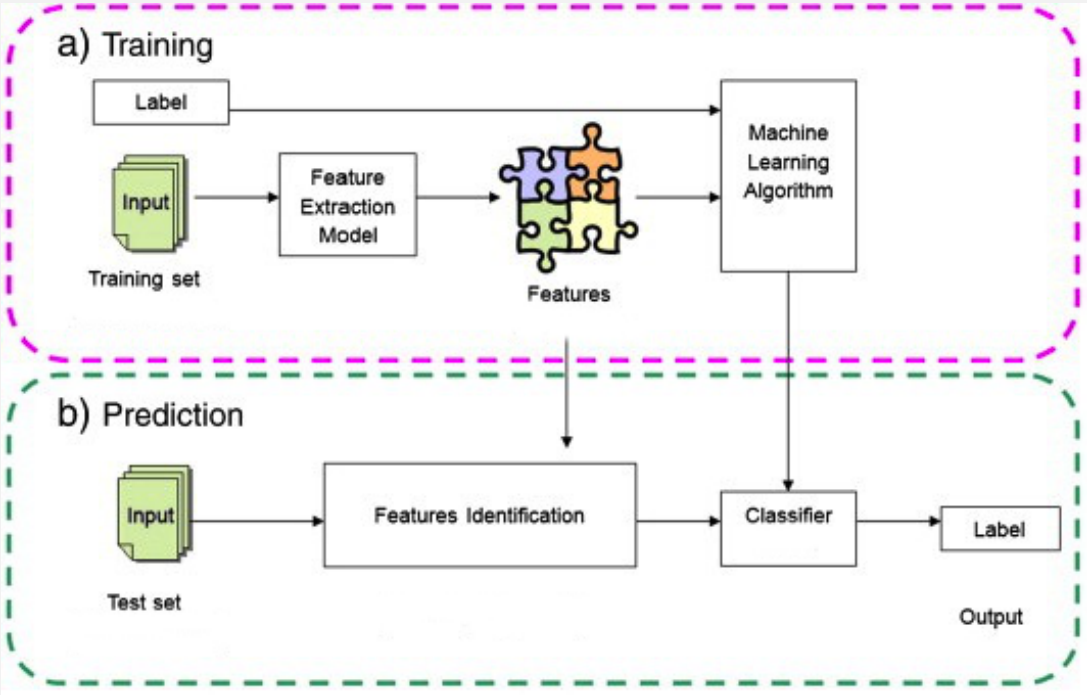
Normalization (Chesterman, 2004)

Computational Investigation of Translationese

- Translated texts exhibit lower lexical variety (type-to-token ratio) than originals (Al-Shabab, 1996)
- Their mean sentence length and lexical density (ratio of content to non-content words) are lower (Laviosa, 1998)
- Corpus-based evidence for the simplification hypothesis (Laviosa, 2002)

Methodology

- Corpus-based approach
- Text classification with machine-learning techniques
- Feature design
- Evaluation



Identifying Translationese

Using text classification

- Baroni and Bernardini (2006)
- van Halteren (2008)
- Kurokawa et al. (2009)
- Ilisei et al. (2010); Ilisei and Inkpen (2011); Ilisei (2013)
- Koppel and Ordan (2011)
- Popescu (2011)

Research Contributions

- Understanding the features of translationese; testing Translation Studies hypotheses (Volansky et al., Forthcoming; Avner et al., Forthcoming)
- Robust classification of translationese (Twitto-Shmuel et al., Forthcoming)
- Language models for statistical machine translation (Lembersky et al., 2011, 2012b)
- Translation models for statistical machine translation (Kurokawa et al., 2009; Lembersky et al., 2012a, 2013)
- Automatic detection of **machine** translated texts (Aharoni et al., 2014)
- Identifying the first language of non-native writers (Tsvetkov et al., 2013)

The Features of Translationese

- Vered Volansky, Noam Ordan, and Shuly Wintner, "On the Features of Translationese", *Literary and Linguistic Computing*, forthcoming
- Goal: test Translation Studies hypotheses using classification as a methodology
- Experimental setup: EUROPARL, 4M tokens in English (O) and 400K tokens translated from each of ten European languages (T)
- After tokenization, the corpus is partitioned into chunks of approximately 2000 tokens (ending on a sentence boundary)
- Classification with Weka (Hall et al., 2009), using SVM with a default linear kernel

Hypotheses

Simplification Rendering complex linguistic features in the source text into simpler features in the target (Blum-Kulka and Levenston, 1983; Vanderauwerea, 1985; Baker, 1993)

Explicitation The tendency to spell out in the target text utterances that are more implicit in the source (Blum-Kulka, 1986; Øverås, 1998; Baker, 1993)

Normalization Efforts to standardize texts (Toury, 1995), "a strong preference for **conventional grammaticality**" (Baker, 1993)

Interference The fingerprints of the source language on the translation output (Toury, 1979)

Features Should...

1. Reflect frequent linguistic characteristics we would expect to be present in the two types of text
2. Be content-independent, indicating formal and stylistic differences between the texts that are not derived from differences in contents, domain, genre, etc.
3. Be easy to interpret, yielding insights regarding the differences between original and translated texts

Features

Simplification Type-token ratio, Mean word length, Syllable ratio, Mean sentence length, Lexical density, Mean word rank, Most frequent words

Explicitation Explicit naming, Single naming, Mean multiple naming, Cohesive markers

Normalization Repetitions, Contractions, Average PMI, Threshold PMI

Interference POS *n*-grams, Character *n*-grams, Prefixes and suffixes, Contextual function words, Positional token frequency

Miscellaneous Function words, Pronouns, Punctuation, Ratio of passive forms, Token unigrams and bigrams

Results: Sanity Check

Category	Feature	Accuracy (%)
Sanity	Token unigrams	100
	Token bigrams	100

Results: Simplification

Category	Feature	Accuracy (%)
Simplification	TTR (1)	72
	TTR (2)	72
	TTR (3)	76
	Mean word rank (1)	69
	Mean word rank (2)	77
	N most frequent words	64
	Mean word length	66
	Syllable ratio	61
	Lexical density	53
	Mean sentence length	65

Results: Explicitation

Category	Feature	Accuracy (%)
Explicitation	Cohesive Markers	81
	Explicit naming	58
	Single naming	56
	Mean multiple naming	54

Results: Normalization

Category	Feature	Accuracy (%)
Normalization	Repetitions	55
	Contractions	50
	Average PMI	52
	Threshold PMI	66

Results: Interference

Category	Feature	Accuracy (%)
Interference	POS unigrams	90
	POS bigrams	97
	POS trigrams	98
	Character unigrams	85
	Character bigrams	98
	Character trigrams	100
	Prefixes and suffixes	80
	Contextual function words	100
	Positional token frequency	97

Results: Reduced Parameter Space

(300 most frequent features)

Category	Feature	Accuracy
	POS bigrams	96
	POS trigrams	96
Interference	Character bigrams	95
	Character trigrams	96
	Positional token frequency	93

Results: Miscellaneous

Category	Feature	Accuracy (%)
Miscellaneous	Function words	96
	Punctuation (1)	81
	Punctuation (2)	85
	Punctuation (3)	80
	Pronouns	77
	Ratio of passive forms to all verbs	65

Conclusion

- Machines can accurately identify translated texts
- The best performing features are those that attest to the 'fingerprints' of the source on the target
- Interference by its nature is a pair-specific phenomenon
- Translation "universals" should be reconsidered. Not only are they dependent on genre and register, they also vary greatly across different pairs of languages
- Ideally, such claims should be studied using a **comparable corpus**

Other Contributions

- Ehud Alexander Avner, Noam Ordan, and Shuly Wintner, "Identifying Translationese at the Word and Sub-word Level", *Literary and Linguistic Computing*, forthcoming
- Gennadi Lembersky, Noam Ordan, and Shuly Wintner, "Language models for machine translation: Original vs. translated texts", *Computational Linguistics* 38(4):799-825, 2012
- Gennadi Lembersky, Noam Ordan, and Shuly Wintner, "Improving statistical machine translation by adapting translation models to translationese", *Computational Linguistics* 39(4):999-1023, 2013
- Naama Twitto, Noam Ordan, and Shuly Wintner, "Statistical Machine Translation and Automatic Identification of Translationese", in preparation

Other Contributions

- Roee Aharoni, Moshe Koppel, and Yoav Goldberg, "Automatic detection of machine translated text and translation quality estimation", *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics*, pages 289-295, 2014
- Yulia Tsvetkov, Naama Twitto, Nathan Schneider, Noam Ordan, Manaal Faruqui, Victor Chahuneau, Shuly Wintner, and Chris Dyer, "Identifying the L1 of non-native writers", *Proceedings of the Eighth Workshop on Innovative Use of NLP for Building Educational Applications*, 2013

Future Directions

- Identification of translationese at the sentence-pair level
- The features of **machine** translationese
- More applications to machine translation

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