Modernizing historical Dutch: the UU system

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Modernizing historical Dutch: the UU system
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Summary
• **Goal**: modernize 17th century Dutch text to allow use of modern NLP resources and tools
• **Method**: combine expert rules, translation pairs from aligned parallel text, existing SMT frameworks
• **Data**: parallel translation of the Bible, 1637/1888
• **Results**: the proposed vocabulary-based method shows promising results on an in-domain test set, performance is impaired for unrelated domains
• **Future work**: refinement of current method, shift to character-based methods

Introduction
• Modernization of spelling and grammar allows use of tools for modern Dutch on historical text
• **Note**: some features (e.g., negative concord and case marking) are lost after modernization
• Quantitative methods can be trained using parallel text, e.g., diachronic translations of the Bible

1637: Ende het gout deses lants is goet
1888: En het goud van dit land is goed
*And the gold of that land is good*

Method
The Bible text is split into a training set (32235 sentences) and a test set (5000 sentences). The following steps are incrementally applied, with associated BLEU scores [1] on the test set ($n = 4$):
• (BLEU: 0.134) No translation.
• (0.507) Baseline: construct 1-to-1 translation lexicon on training data, using sentences of equal length.
• (0.530) Perform alignment to handle sentences of unequal length, extract additional translation pairs.
  ○ custom alignment algorithm using fixed anchor tokens
• (0.581) Compile a set of manual modernization rules.
  ○ e.g., strip case markers
• (0.600) Construct many-to-1 translation lexicon using aligned sentences.
• (0.619) Use POS-information for already modernized words to choose the right alternative for historical words.
  ○ haer + V → hen
  ○ haer + N → hun
• Selection for many-to-1 and POS rules: hill-climbing optimization on BLEU score on training data.
• (0.627) Compile rules to address punctuation differences between Bible translations.

• (0.597) Moses with basic training settings.
• (0.616) Apply MERT tuning.
• (0.639) Post-processing of incorrect output of trained Moses capitalization model.
• (0.644) Manual modernization rules on Moses output.
• (0.647) Moses with manual rules, multi-alignment, and POS patterns.
• (0.653) As above, with punctuation rules.

CLIN Shared Task test set results
• Additional phonetic rewriting rules to address OOV issues

Discussion and future work
• Vocabulary-based method not highly suitable for unrelated texts
• Diachronic differences: e.g., *en* translated as negation, but used in later texts only as conjunction
• Overtranslation, i.e., arguably correct results not present in the reference translation
  • *ofte-of, der-van de, hare-hun, 't-het, zo als-zoals, hebbe-heb, ...*
• The current method can be refined for in-domain texts
• Character-based methods may offer wider applicability

References

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