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

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
  - e.g., strip case markers
- **(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.
  - \(\text{haer} + \text{V} \rightarrow \text{hen}\)
  - \(\text{haer} + \text{N} \rightarrow \text{hun}\)
  - 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.

Discussion and future work

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

References


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