

# Proposals for master theses

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# Proposals

1. Word Segmentation in Neural MT
2. Cross-sentence context for MT of novels

# Problem

Aim: better word segmentation for Morphologically Rich Languages (MPL), e.g. Finnish, Turkish.

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## Current situation

- ▶ No segmentation: severe vocabulary limit, <100K most frequent words
- ▶ Byte-pair encoding (BPE) [Sennrich et al., 2015]: unsupervised & good results, but not for MPL
- ▶ Morph segmentation
  - ▶ Supervised [Sánchez-Cartagena and Toral, 2016]: good results for MPL, but language-dependent & leads to long sequences
  - ▶ Unsupervised [Ataman et al., 2017]: good results for MLP, but not compared to supervised

# Task

Segmentation	Sentence
None	haluaisimme , että oppisimme tästä yhden perusasian
BPE: 60k ops	haluaisimme , että opp→ ←-isimme tästä yhden perusasi→ ←-an
Omorfi	halua→ ←-isi→ ←-mme , että opp→ ←-isi→ ←-mme tästä yhde→ ←-n perus→ ←-asia→ ←-n
Omorfi + BPE: 1k ops.	halua→ ←-isimme , että opp→ ←-isimme tästä yhden perus→ ←-asian
English	<i>there is one basic lesson I would like us to learn from this</i>

Example of the application of the different segmentation schemes to a Finnish sentence.

- ▶ Note the compound word *perusasian*: *perus* (“basic”) + *asia* (“thing, affair”) + case marker *-n*
- ▶ How is the compound word *perusasian* segmented by the different schemes?

# Task

1. Compare and analyse supervised [Sánchez-Cartagena and Toral, 2016] vs unsupervised [Ataman et al., 2017] morph segmentation approaches
2. Improve word segmentation for MRLs given the insights from the analysis.
3. Test in a shared task: WMT 2018 (Finnish, Turkish, Estonian)

# What is there

- ▶ Segmenters: BPE, Omorfi, morfessor
- ▶ Strong baseline system for English–Finnish (winner WMT'16) [Sánchez-Cartagena and Toral, 2016]

# Plan

Word Segmentation in Neural MT

Cross-sentence context for MT of novels



# Problem

Aim: model cross-sentence context for automatic translation of novels

Current situation

- ▶ Sentences translated in isolation in MT
- ▶ Literary texts have dense reference chains → context beyond sentence is essential for translation [Voigt and Jurafsky, 2012]
- ▶ First approaches to model cross-sentence context in neural MT [Wang et al., 2017]





# Task

- ▶ Investigate and improve the neural MT system with context
- ▶ Build two neural MT systems tailored to novels for e.g. English→Dutch, with and without cross-sentence context
- ▶ Evaluate the impact on the translations

# What is there

- ▶ Neural MT toolkits
- ▶ Experimental neural MT system with cross-sentence context
- ▶ Neural MT system tailored to novels
- ▶ GUI for fine-grained linguistic evaluation

# References I

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-  Voigt, R. S. U. and Jurafsky, D. S. U. (2012). Towards a Literary Machine Translation: The Role of Referential Cohesion. *The 2012 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT 2012)*, pages 18–25.

## References II



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*CoRR*, abs/1704.04347.

Thank you!

Questions?