

January 24, 2022

## Call for Master Thesis: „Using Quantum Computing in Natural Language Processing“

### Topic

In recent years, first approaches have been proposed to apply techniques of quantum computing [0] to natural language processing (NLP) tasks, such as machine translation, question answering, and relation extraction from text. However, the practical applicability of quantum NLP (QNLP) has been investigated only to a limited degree so far. Examples are given in [1][2].



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In this thesis, the student is asked to first review state-of-the-art approaches for selected QNLP tasks, such as relation extraction. Based on existing frameworks, such as lambeq, the student will then design, implement, and evaluate experiments – similar to [1] – to see the current limitations and potential of QNLP. The focus will be particularly on scaling up QNLP-implementations as far as possible given available hardware [3].

### Prerequisites

The student should have solid programming skills in Python. Furthermore, the student should be highly motivated to study the foundations of quantum computing and to proactively work on the project.

[0] <https://www.youtube.com/watch?v=-y3CBaW50VA>

[1] <https://arxiv.org/pdf/2102.12846.pdf>

[2] <https://github.com/CQCL/lambeq>

[3] [https://en.wikipedia.org/wiki/Cloud-based\\_quantum\\_computing](https://en.wikipedia.org/wiki/Cloud-based_quantum_computing)

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