Michael **Schlichtkrull**

michschli.github.io michschli michaelsejr

About me

I am Michael, a Danish PhD student working with Ivan Titov on natural language processing. I currently focus on question answering over large data sources such as knowledge graphs, but I am interested in all aspects on natural language understanding.

I want to spend my life solving interesting and challenging problems, and creating technology that makes life easier. I want to bridge the communication gap between humans and machines. Academically, I want to develop and apply neural and probabilistic algorithms for the hard problem of natural language understanding.

I like studying machine learning techniques and applying them to interesting problems. I have a deep-seated love of learning, and I take great pleasure in discovering new knowledge. I enjoy reading, mostly science fiction and non-fiction with the occasional classic in the mix. I also like cooking, cycling, computer gaming, hiking, and badminton.

Education

PhD Candidate in Natural Language Processing

Amsterdam, Netherlands & Edinburgh, United Kingdom

University of Amsterdam — *Sep 2016 - Present*

- The subject of my PhD is broad-coverage semantics. We develop neural models of graph-structured data to exploit structure in text and knowledge bases. The goal is to perform complex and open question answering against knowledge bases in a fully end-to-end fashion.
- My advisor is Ivan Titov.
- While I am posted as a guest researcher at the University of Edinburgh, I am formally affiliated with the University of Amsterdam.
- As a first step, we applied our graph convolutional model to the problems of entity classification and link prediction and demonstrated how our system outperforms traditional factorization baselines.
- We now work on combining our relational model with a model of text to move into question answering.

Master of Science in IT and Cognition

Copenhagen, Denmark

University of Copenhagen — *Sep 2014 - Aug 2016*

- My thesis was titled "Cross-lingual Dependency Parsing with Tensor-LSTM". I achieved state-of-the-art performance on cross-lingual parsing for truly low-resource languages through an extension of LSTM developed for the project. My thesis was supervised by Anders Søgaard, with whom I later collaborated on a publication on the subject.
- The programme is offered by the Center for Language Technology, and approaches language processing as an interdisciplinary field involving mathematics, machine learning, and knowledge from linguistics and cognitive science.
- Courses in natural language processing, statistical machine learning, probabilistic modelling, and image processing, with a secondary focus on cognitive science.

Bachelor of Science in Software Engineering

Copenhagen, Denmark

Technical University of Denmark — *Sep 2010 - Jul 2013*

- I wrote my Bachelor's Thesis on coreference resolution in semantic parsing, applying a formal logical approach based on type theory. My supervisor was Jørgen Villadsen.
- Courses in mathematics, probability theory, graph theory, algorithms, formal logic, and computer science modelling.

Experience

Research Intern

London, United Kingdom

Facebook AI Research — *June 2020 - September 2020*

- Ongoing research internship in NLP at FAIR London.
- Investigation into and development of a system for question answering and fact checking over large open collections of tabular data.

Applied Science Intern

Berlin, Germany

Amazon — *July 2018 - September 2018*

- Research internship in NLP at Amazon Berlin.
- Development of a system for question generation over natural text.

Student Assistant in IT Development *Copenhagen, Denmark*

Saxo.com ApS *June 2014 - June 2016*

- Development of server-side software for online booksales, working mainly in C# and SQL.
- Implementation and exposure of functionalities through a public API.
- Occasional assistance on crucial front-end bug-finding and development.

Teaching Assistant for Algorithms and Data Structures I & II *Copenhagen, Denmark*

Technical University of Denmark *February 2012 - December 2012*

- Exercise sessions and homework grading for Algorithms and Data Structures I, taught by Inge Li Gøtz. Introductory material including sorting, searching, heaps, trees, and elementary graph theory.
- Exercise sessions for Algorithms and Data Structures II, taught by Paul Fischer. Higher-level material including flow algorithms, balanced data structures, and graph partitioning.

Academic publications

How do Decisions Emerge across Layers in Neural Models? Interpretation with Differentiable Masking in which we propose a technique for interpreting neural models through a learned erasure function, and apply said technique to study BERT models on sentiment classification and question answering. With De Cao, N., Aziz, W., and Titov, I. *Under review at EMNLP 2020*.

Evaluating for Diversity in Question Generation over Text in which we investigate diversity in question generation over text, proposing an alternative evaluation metric to account for semantic diversity in references and demonstrating significant improvement on an existing system with the addition of a variationally trained latent variable. With Cheng, W. *To appear on arXiv*.

Modeling Relational Data with Graph Convolutional Networks in which we obtain state-of-the-art results with a neural model for relational link prediction by developing and applying an extension of the recently proposed Graph Convolutional Networks to relational data. With Kipf, T. N., Bloem, P., Berg, R. V. D., Titov, I., & Welling, M. In *European Semantic Web Conference, 2018*.

Cross-Lingual Dependency Parsing with Late Decoding for Truly Low-Resource Languages in which we improve upon the state of the art for cross-lingual dependency parsing through annotation projection and an extension of LSTM. With Søgaard, A. In *Proceedings of the 15th Conference of the European Chapter of the Association for Computational Linguistics, 2017*.

Taxonomy Enrichment by Evidence Ranking in which we beat a hard baseline for taxonomy enrichment through a simple method of candidate extraction and scoring inspired by results in information retrieval. With Alonso, H. M. In *Proceedings of the 10th International Workshop on Semantic Evaluation, 2016.*

Learning Affective Projections for Emoticons on Twitter in which I develop a distantly supervised algorithm for interpreting emoticons on social media data using skipgram embeddings. In *Proceedings of the 6th IEEE International Conference on Cognitive Infocommunications, 2015*. Won best paper award.

Skills

Natural languages	English (fluent), Danish (native), German (Proficient), Spanish (Intermediate)
Programming languages	Python, Java, C#, C, C++, ML, Prolog, F#, Matlab, Javascript, Visual BASIC
Frameworks	Pytorch, Tensorflow, Theano, Scikit-learn
Other technologies	SQL, SPARQL, CSS, ASP.NET