Sebastian Ruder

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Education

- **National University of Ireland** **Galway, Ireland**
  College of Engineering and Informatics, Ph.D. Natural Language Processing *10/2015 – Present*
  - I am interested in creating methods that allow efficient adaptation to novel domains and tasks in real-world scenarios by leveraging knowledge from related tasks and domains. My main research interests are domain adaptation, transfer learning, and multi-task learning for Natural Language Processing.
- **University of Copenhagen** **Copenhagen, Denmark**
  Natural Language Processing Group, Department of Computer Science *04/2017 – 06/2017*
  - Research visit invited by Anders Søgaard.
  - Created a new model for multi-task learning that learns which parts of the model to share.
- **Ruprecht-Karls-Universität Heidelberg** **Heidelberg, Germany**
  Institute of Computational Linguistics, B.A. Computational Linguistics, English Linguistics *10/2012 – 09/2015*
  - Final grade: 1.0 (German scale), i.e. GPA 4.0; thesis: *Construction and Analysis of an Emotion Proposition Store*
- **Trinity College** **Dublin, Ireland**
  School of Computer Science and Statistics, Computer Science and Language *09/2014 – 01/2015*
  - Semester abroad
  - relevant courses: AI, Fuzzy Logic, High-Tech Entrepreneurship

Experience

- **AYLIEN** **Dublin, Ireland**
  Research Scientist *10/2015 – Present*
  - Developed aspect-based sentiment analysis (ABSA) endpoint[1] and created sentiment analysis models on-par with state-of-the-art[2].
  - Developed models for a novel form of stance detection from scratch. Collected data, crowd-sourced annotations, and iterated upon the models in dialogue with the customer.
  - My current work focuses on productizing research insights by developing efficient transfer learning algorithms and state-of-the-art models for novel problems as well as existing applications such as stance detection and emotion detection.
- **IBM** **Munich, Germany**
  Extreme Blue Intern, Watson *08/2015 – 09/2015*
  - Design and implementation of text analysis ML components applied to customer data of leading German insurance company *Versicherungskammer Bayern*; automatically identifies structural semantics and sentiment of incoming e-mails, e.g. complaints and classifies email based on reason for complaint.
  - Pitched project to audience at European Expo and was chosen as one of eight teams to pitch to IBM customers; project was referred to as a "lighthouse project for Watson in Europe" by jury members.
  - Project was awarded Digital Thought Leadership award in leading contest of German insurance industry by leading German newspaper *Süddeutsche Zeitung* and Google[3] and covered by *Süddeutsche Zeitung*[4].
- **Microsoft** **Dublin, Ireland**
  Linguistic Engineering Intern, XBox *02/2015 – 06/2015*
  - Contributed to developing an ML system for analyzing linguistic complexity of strings in C# for localization prioritization during testing; performed feature analysis and framed problem as anomaly detection.

[1] https://developer.aylien.com/text-api-demo?tab=absa
[2] https://developer.aylien.com/text-api-demo?tab=sentiment
[3] https://www.sv-veranstaltungen.de/site/fachbereiche/versicherungs-leuchtturm
[4] http://www.sueddeutsche.de/wirtschaft/kuenstliche-intelligenz-aerger-fuer-watson-1.2772927

  - Created proof of concept and implemented morphology-based terminology validation algorithm.
  - Evangelized customer sentiment analysis efforts, drove cross-team collaboration, and provided insights to stakeholders.

- **The OpenCog Foundation** `opencog.org`
  Google Summer of Code Intern *Summer 2014*
  - Implemented deductive reasoning algorithms to enable a model to make common-sense inferences, e.g. *All men are mortal. Socrates is a man.* $\rightarrow$ *Socrates is mortal.*
  - Applied inference using probabilistic logic networks on the output of a relationship extractor.
  - Documented and extended Python code for temporal inference.

- **Lingenio GmbH** **Heidelberg, Germany**
  Software Engineering Intern *Spring 2014*
  - Created a converter from TBX to Lingenio native format and vice versa.
  - Integrated TBX term bases in Dictionary Server; created localized web service using Jinja2, Flask-Babel, and lighttpd.

- **SAP** **Walldorf, Germany**
  Working Student, Development University *02/2013 – 02/2014*
  - Created content for internal programming and Design Thinking courses.
  - Automated reporting processes, e.g. reduced expenditure of work for monthly training report from 8 hours to 2 hours using Excel / VBA scripts.

- **TEMIS** **Heidelberg, Germany**
  Freelancing Developer *02/2013 – 10/2013*
  - Created a cosine metric-based word sense disambiguation system leveraging text extracted from Wikipedia and DBpedia dumps; achieved performance comparable to the state-of-the-art.

Awards

- Scholarship of the Irish Research Council *10/2015 – Present*
- *Cusanuswerk* scholarship of the German state *04/2014 – 09/2015*
- Microsoft Certified Professional (Programming in C#) *06/2015*
- Best Delegate award in various Model United Nations conferences *11/2012 – 01/2014*
- Second and third prizes *Bundeswettbewerb Fremdsprachen*, national foreign languages competition *2007 – 2008*
- First and second prizes *Landeswettbewerb Mathematik*, state mathematics competition *2006 – 2008*

Languages and Technologies

Programming Languages: Python, Java, C#, R, C, LaTeX, Prolog, JavaScript, SPARQL
Technologies: SciPy, NumPy, Keras, TensorFlow, DyNet, scikit-learn, NLTK, CoreNLP, MALLET, Weka, UNIX, Git
Natural Languages: Fluent in German and English, advanced in French and Spanish, beginner in Portuguese and Latin
Open Source Contributions: The OpenCog Foundation

Other activities

- **Natural Language Processing Dublin organizer** *08/2016 – Present*
  - Organized 9 events. Meetup[5] has 500+ members and connects students, researchers, and industry professionals.

[5] `https://www.meetup.com/NLP-Dublin/`

Publications

1. Sebastian Ruder, Ivan Vulić, Anders Søgaard (2017). A Survey Of Cross-lingual Word Embedding Models. arXiv preprint arXiv:1706.04902.
2. Sebastian Ruder, Barbara Plank (2017). Learning to select data for transfer learning with Bayesian Optimization. In *Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing*, Copenhagen, Denmark.
3. Sebastian Ruder (2017). An Overview of Multi-Task Learning in Deep Neural Networks. arXiv preprint arXiv:1706.05098.
4. Sebastian Ruder, Joachim Bingel, Isabelle Augenstein, Anders Søgaard (2017). Sluice networks: Learning what to share between loosely related tasks. arXiv preprint arXiv:1705.08142.
5. Sebastian Ruder, Parsa Ghaffari, John G. Breslin (2017). Data Selection Strategies for Multi-Domain Sentiment Analysis. arXiv preprint arXiv:1702.02426.
6. Sebastian Ruder, Parsa Ghaffari, John G. Breslin (2017). Knowledge Adaptation: Teaching to Adapt. arXiv preprint arXiv:1702.02052.
7. Sebastian Ruder, Parsa Ghaffari, John G. Breslin (2016). Towards a continuous modeling of natural language domains. In *Proceedings of EMNLP 2016 Workshop on Uphill Battles in Language Processing: Scaling Early Achievements to Robust Methods*, pages 53-57, Austin, Texas, US.
8. Sebastian Ruder, Parsa Ghaffari, John G. Breslin (2016). A Hierarchical Model of Reviews for Aspect-based Sentiment Analysis. In *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing*, pages 999–1005, Austin, Texas, US.
9. Ian D. Wood and Sebastian Ruder (2016). Emoji as emotion tags for tweets. In *Emotion and Sentiment Analysis Workshop, LREC*, Portorož, Slovenia.
10. Sebastian Ruder, Peiman Barnaghi, John G. Breslin (2016). Analysis and Applications of a Novel Corpus of Influencers on Twitter. In *Twitter for Research Conference*, Galway, Ireland.
11. Sebastian Ruder, Parsa Ghaffari, John G. Breslin (2016). INSIGHT-1 at SemEval-2016 Task 4: Convolutional Neural Networks for Sentiment Classification and Quantification. In *Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval 2016)*, San Diego, US.
12. Sebastian Ruder, Parsa Ghaffari, John G. Breslin (2016). INSIGHT-1 at SemEval-2016 Task 5: Convolutional Neural Networks for Multilingual Aspect-based Sentiment Analysis. In *Proceedings of the 10th International Workshop on Semantic Evaluation (SemEval 2016)*, San Diego, US.
13. Sebastian Ruder (2016). An overview of gradient descent optimization algorithms. arXiv preprint arXiv:1609.04747.

Talks

- Natural Language Processing Copenhagen Meetup Talk, May 2017: Transfer Learning for NLP[6]
- Accenture Tech Talk, March 2017: Transfer Learning – The Next Frontier for Machine Learning
- LinkedIn Tech Talk, March 2017: Transfer Learning – The Next Frontier for Machine Learning[7]
- NLP Dublin meetup, December 2016: NIPS 2016 Highlights[8]
- INSIGHT SIG NLP meetup, August 2016: A Hierarchical Model of Reviews for Aspect-based Sentiment Analysis[9]
- NLP Dublin meetup, August 2016: Softmax Approximations for Learning Word Embeddings and Language Modelling[10]

[6] https://www.slideshare.net/SebastianRuder/transfer-learning-for-natural-language-processing
[7] https://www.slideshare.net/SebastianRuder/transfer-learning-the-next-frontier-for-machine-learning
[8] http://www.slideshare.net/SebastianRuder/nips-2016-highlights-sebastian-ruder
[9] http://www.slideshare.net/SebastianRuder/a-hierarchical-model-of-reviews-for-aspectbased-sentiment-analysis
[10] http://www.slideshare.net/SebastianRuder/softmax-approximations-for-learning-word-embeddings-and-language-modeling-sebastian-ru