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Stephan Gouws

Research Interests

Deep Learning, NLP, Machine Translation

Education

2011 – 2015 **PhD**, *Stellenbosch University*, South Africa.
Thesis: *Training Neural Word Embeddings for Transfer Learning and Translation*,
Committee: Yoshua Bengio (UdeM), GJ van Rooyen (Stellenbosch). Eduard Hovy (CMU).

Mar 2013 – Sept 2013 **PhD Exchange Student**, *Université de Montréal*, Canada.
I worked with Yoshua Bengio on cross-lingual neural language modelling and spam detection using deep learning.

Jan 2011 – Aug 2011 **Visiting PhD Student**, *Information Sciences Institute (ISI)*, USC, USA.
I worked with Donald Metzler on a text normalization system for translating noisy Web text to standard English with state-of-the-art results. Developed a simple and efficient Map-Reduce based algorithm for mining noisy/clean translation pairs.

2008 – 2010 **MSc(Eng) Cum Laude**, *Stellenbosch University*, South Africa.
Thesis on graph-based algorithms for computing document similarity using the Wikipedia link-graph.

2004 – 2007 **BEng (E&E w CompSci)**, *Stellenbosch University*, South Africa.
Undergraduate double major in Electronic Engineering and Computer Science.

Work Experience

Feb 2017 – Present **Research Scientist, Google Brain**, *London*, UK.
Working on memory-augmented models for language understanding and style transfer for images.

May 2015 – Feb 2017 **Research Scientist, Google Brain**, *Mountain View*, CA, US.
Implemented noise-contrastive training losses in TensorFlow (http://www.tensorflow.org/) for its first release. Developed the tutorials on vector representations for words. Worked on Google's Neural Machine Translation System (http://translate.google.com/), a deep learning replacement for the old system, which improved accuracies on all language-pairs (arXiv paper).

Apr 2014 – Aug 2014 **Research Intern, Google Brain**, *Mountain View*, CA, US.
Worked on improved representations and models of natural language (joint work with Tomas Mikolov and Greg Corrado). I developed a novel, adaptive hierarchical softmax layer (**SimTree**) which efficiently adapts tree-structure based on the data to improve model perplexity. I developed a novel bilingual neural language model (**BilBOWA**) which learns to embed multiple languages in the same vector space and scales very efficiently to train on billions of words in under a day on a standard desktop machine. I extended the `word2vec` toolkit to incorporate both models.

Sept 2013 – Dec 2013 **Research Intern, Microsoft Research**, *Cambridge*, UK.
Developed deep learning methods for predicting song metadata directly from the raw audio ("auto-tagging"; joint work with Thore Graepel and Ulrich Paquet). I implemented and trained deep convolutional neural networks on GPUs and devised novel multi-label objective functions which achieved state-of-the-art results on the Magnatagatune dataset.

May 2013 – Aug 2013 **Researcher, ZeroSpam.ca**, *Montréal*, QC, Canada.
Implemented and evaluated several deep neural network models for spam detection. Improved 6.5% absolute F-score over their state-of-the-art industrial system.

Awards

2013 Google scholarship to attend LxMLS 2013 (13 awarded out of 250 applicants).

2009–2014 National Research Foundation Masters and Doctoral Innovation Scholarship Awards.

2004, 2005 Engineering Undergraduate Academic Honour Role (Top 20)

2003 Dept of Education Award: 2nd highest GPA of all high school students in South Africa.

Selected Talks

Jun 2015 *BilBOWA: Bilingual Representations of Words without Alignments*, **ICML**, France.
Nov 2014 *Deep Learning for NLP* **Copenhagen**.
Nov 2013 *Cross-lingual Learning Using Neural Language Models.* **University of Copenhagen**.
Nov 2013 *A Tutorial on Deep Learning.* **Microsoft Research**, Israel.
Dec 2012 *Deep learning for NLP*. Languages and Technology Institute, **CMU**.
Jun 2012 *Revisiting word representations*. **Université de Montréal**.

Publications

Please see my Google Scholar Page (https://scholar.google.com/citations?user=ILTdYUYAAAAJ) for the most up to date list of publications.

References

Available upon request.