

Sandeep Subramanian

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GitHub: <https://github.com/MaximumEntropy>

Website: <http://www.sandeeplearning.com/>

Education

Université de Montréal (MILA) / PhD Computer Science

SEPTEMBER 2016 - PRESENT, Montreal, QC, Canada

Advisors: Christopher Pal & Yoshua Bengio

Relevant Coursework

- Probabilistic Graphical Models (IFT-6269)
- Deep Learning (IFT-6266)

Carnegie Mellon University / M.S Language Technologies

AUGUST 2014 - AUGUST 2016, Pittsburgh, PA, USA

Relevant Coursework

- Algorithms for Natural Language Processing (11-711)
- Machine Learning (10-701)
- Machine Learning for Text Mining (11-741)
- Large Scale Multimedia Analysis (11-775)
- Independent Study - Computational Biology (11-925)
- Deep Learning (11-785)
- Multimodal Machine Learning (11-776)
- Machine Translation (11-731)
- Advanced Multimodal Machine Learning (11-777)

VIT University / B.Tech Computer Science and Engineering

JUNE 2010 - MAY 2014, Vellore, Tamil Nadu, India

Relevant Coursework

- Artificial Intelligence
- Theory of Computation
- Algorithm Design and Analysis
- Data Structures and Algorithms
- Graph Theory
- Applied Probability, Statistics and Reliability
- Linear Algebra

Experience

Microsoft Maluuba (Microsoft Research Montreal) / Research Intern

MAY 2017 - AUGUST 2017, Montreal, QC

Machine Reading and Comprehension (MRC) team

Mentor: Adam Trischler

Interned with the Machine Reading and Comprehension (MRC) team working on neural models for key phrase extraction and question generation. Also worked on transfer learning sentence representations.

Maluuba / Part Time Research Scientist Intern

SEPTEMBER 2016 - MAY 2017, Montreal, QC

Machine Reading and Comprehension (MRC) team

Mentor: Adam Trischler

Interned with the Machine Reading and Comprehension (MRC) team working on question generation.

Carnegie Mellon University / Graduate Research Assistant

AUGUST 2014 - AUGUST 2016, Pittsburgh, PA

Awarded a Graduate Research Fellowship for a full tuition waiver and stipend

Advisor: Madhavi Ganapathiraju

Language Technologies Institute, School of Computer Science, Carnegie Mellon University Department of Biomedical Informatics, School of Medicine, University of Pittsburgh

Research: Machine Learning & Natural Language Processing, BioNLP

Invention Labs / Intern (<http://www.avazapp.com/>)

DECEMBER 2014 - JULY 2014, IIT Madras Research Park, Chennai, Tamil Nadu, India

Mentor: Ajit Narayanan

Contributed to the development of AvazFreespeech, an Augmentative and Assistive Communication (AAC) application to help kids with autism communicate and learn english. The application converts a semantic graph constructed by kids into syntax using X-bar theory.

Indian Institute of Technology, Madras / Research Intern (NLP)

MAY 2012 - JUNE 2012, Chennai, Tamil Nadu, India

Advisor: Sutanu Chakraborti

Worked on understanding the shortcomings of sentiment classifiers.

Books, Publications & Patents

BOOKS:

Smart Cyclone Alerts Over the Indian Subcontinent : New Insights Into Storm Mitigation / LAP Lambert Academic Publishing

Sandeep Subramanian, Satyajit Ghosh and Vivek Vidyasagaran

<https://www.amazon.com/Smart-Cyclone-Alerts-Indian-Subcontinent/dp/3659794333>

Authored a book that discusses the following in great detail

- A framework to process large-scale geospatial data
- Using geospatial data with existing open source climate models for weather and extreme event prediction
- Downstream use of weather data for societal good - warning systems for cyclones in India

PAPERS:

Learning General Purpose Distributed Sentence Representations via Large-scale Multi-task Learning / ICLR 2018 (Under Review)

Sandeep Subramanian, Adam Trischler, Yoshua Bengio, Christopher Pal

OCTOBER 2017

A Large-scale one-to-many multi-task model with diverse training objectives such as skip-thoughts, multilingual machine translation, natural language inference and constituency parsing to learn general purpose fixed length sentence representations. Achieves state-of-the-art results when used in a transfer learning setting

A Deep Reinforcement Learning Chatbot / NIPS 2017 Demo Track

Iulian V. Serban, Chinnadhurai Sankar, Mathieu Germain, Saizheng Zhang, Zhouhan Lin, **Sandeep Subramanian**, Taesup Kim, Michael Pieper, Sarath Chandar, Nan Rosemary Ke, Sai Mudumba, Alexandre de Brebisson, Jose M. R. Sotelo, Dendi Suhubdy, Vincent Michalski, Alexandre Nguyen, Joelle Pineau, Yoshua Bengio

SEPTEMBER 2017

Our Amazon Alexa Prize Socialbot that uses reinforcement learning dialog manager to pick responses from an ensemble of rule-based and neural domain-specific dialog systems.

Neural Models for Key Phrase Detection and Question Generation / Arxiv

Sandeep Subramanian, Eric Yuan, Tong Wang, Saizheng Zhang, Adam Trischler & Yoshua Bengio
JUNE 2017

A two step formulation for generating question from a text document - extract keyphrases to ask questions about with a pointer network and condition on these and the document to generate questions with a sequence-to-sequence model with a copy mechanism.

Adversarial Generation of Natural Language / ACL 2017 Repl4nlp workshop

Sandeep Subramanian*, Sai Rajeshwar*, Francis Dutil, Christopher Pal, Aaron Courville
MAY 2017

A simple adversarial formulation for generating text from scratch without pretraining or gradient estimators to overcome the problem of backpropagation through discrete outputs.

Machine Comprehension by Text-to-Text Neural Question Generation / ACL 2017 Repl4nlp workshop

Eric Yuan, Tong Wang, Caglar Gulchere, Alessandro Sordani, Philip Bachman, **Sandeep Subramanian**, Saizheng Zhang, Adam Trischler
MAY 2017

A sequence-to-sequence model for generating MRC-style questions. The model uses reinforcement learning with several rewards like fluency, answerability by a pretrained QA system etc.

Deep Complex Networks / Arxiv

Chiheb Trabelsi*, Olexa Bilanuik*, Dmitriy Serdyuk, **Sandeep Subramanian**, Joao Felipe Santos, Soroush Mehri, Negar Rostamzadeh, Yoshua Bengio and Christopher Pal
MARCH 2017

A formulation of convolutional residual networks using complex numbers - complex convolutions, complex batch normalization and complex weight initialization strategies

Neural Architectures for Named Entity Recognition / NAACL 2016

Guillaume Lample, Miguel Ballesteros, **Sandeep Subramanian**, Kazuya Kawakami and Chris Dyer
JANUARY 2016

Named Entity Recognition using character and token-level bidirectional LSTMs with a CRF and Stack-LSTMs . State-of-the art results on NER in English, Spanish and Dutch.

A pilot study on the prevalence of DNA palindromes in breast cancer genomes / BMC Genomics

Sandeep Subramanian, Srilakshmi Chaparala, Viji Avali and Madhavi Ganapathiraju
JULY 2016

Characterizing the importance of DNA palindromes in the disease progression of breast cancer.

PATENTS :

A Novel Computational Framework for Extreme Weather Alerts/ Indian Patent (Under Review)

Sandeep Subramanian, Vivek Vidyasagan and Satyajit Ghosh
APRIL 2014

Invited Talks

Neural Models for Key-phrase Extraction and Question Generation / IBM Research Bangalore

SEPTEMBER 2017

Select Projects

Swych - Language Learning from context (<http://www.swych.it>)

JAN 2015 - MAY 2016

- Novel means of acquiring foreign languages via code-switching in language
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Skills: Python, C/C++, Numpy/Scipy, PyTorch, Theano, Django, Javascript, JQuery