

Andrea Madotto

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EDUCATION

University of Pisa, Italy
M.Sc. in Computer Science, 2015 - 2017
Final mark: 110/110 (Honours)

Hong Kong Baptist University, Hong Kong
M.Sc. in Advanced Information Systems, 2014 - 2015
GPA: 3.86/4

University of Perugia, Italy
B.Sc. in Computer Science, 2011 - 2014
Final mark: 110/110 (Honours)

EXPERIENCE

Research Assistant HKUST
Sept 2017 – present Hong Kong, HK
Conducting research on Deep Learning Algorithms at the HKUST Centre for Artificial intelligence Research (CAiRE) lab. I mainly worked on building end-to-end architectures to model dialogue responses. Currently my research interests are:

- Learning to Learn (a.k.a. meta-learning)
- End-to-End dialogue systems using Memory Augmented Neural Networks
- Multi-Task learning for word and sentence level embeddings

Teaching Assistant HKUST
Feb 2018 – May 2018 Hong Kong, HK
TA of Building Interactive Intelligent Systems (a.k.a. Deep Learning for NLP), join course of the B.Sc. in CSE and ECE held in the The Hong Kong University of Science and Technology.

- taught and prepared most of the tutorial classes and exercises
- prepared several lectures, in particular Recurrent Neural Network (Seq2Seq etc.)

Teaching Assistant UniPi
Mar 2017 – Jun 2017 Pisa, IT
Advanced Programming TA of the M.Sc. in Computer Science held in University of Pisa.

- developed several seminars presented during the course, including lab exercises and class slides
- participated in the creation of writing assignments as well as grading the final exam

Adjunct Lecturer UniPi
Jan 2017 – Mar 2017 Pisa, IT
Taught Databases course in the Specialization School in Medical Physics of

- developed course material, including lab exercises and class slides
- created writing assignments
- evaluated student course work, as well as grading the final project

Research Assistant HKBU
Aug 2015 – Feb 2016 Hong Kong, HK
Conducted research on algorithms to predict disease spreading in Complex Networks.

- analysed Optimization Algorithms and basic Statistical Learning Theory
- designed and implemented novel algorithms for middle size Complex Networks
- teacher assistant for several courses, mainly lab classes and paper grading

PUBLICATIONS

Madotto, A., Wu, CS., Fung, P. (2018). Mem2Seq: Effectively Incorporating Knowledge Bases into End-to-End Task-Oriented Dialog Systems. Accepted at Association for Computational Linguistics (ACL) 2018. Preprint: <http://arxiv.org/abs/1804.08217>.

Wu, CS., **Madotto, A.**, Winata, GI., Fung, P. (2018). End-to-End Dynamic Query Memory

Network for Entity-Value Independent Task-Oriented Dialog. International Conference on Acoustics, Speech and Signal Processing (IEEE-ICASSP).

URL: https://2018.ieeeicassp.org/Papers/ViewPapers_MS.asp?PaperNum=3749j.

Wu, CS., **Madotto, A.**, Winata, GI., Fung, P. (2017). End-to-End Recurrent Entity Network for Entity-Value Independent Goal-Oriented Dialog Learning. Dialog System Technology Challenges (DSTC6). URL: http://workshop.colips.org/dstc6/papers/track1_paper02-wu.pdf.

Madotto, A. and Attardi, G. (2017). Question Dependent Recurrent Entity Network for Question Answering. NL4AI: 1st Workshop on Natural Language for Artificial Intelligence (NL4AI). URL: http://ceur-ws.org/Vol-1983/paper_07.pdf.

Attardi, G., Carta, A., Errica, F., **Madotto, A.**, and Pannitto, L. (2017). Fa3l at semeval- 2017 task 3: A three embeddings recurrent neural network for question answering. In Proceedings of the 11th International Workshop on Semantic Evaluation (SemEval-2017), pages 290295, Vancouver, Canada. Association for Computational Linguistics. URL: <http://www.aclweb.org/anthology/S17-2048>

Madotto, A and Liu, J. Super-Spreader Identification Using Meta-Centrality. Nature Scientific Report 6, 38994; DOI: [10.1038/srep38994](https://doi.org/10.1038/srep38994) (2016).

Chiancone, A. and **Madotto, A.**, 2015. A Multistrain Bacterial Model for Link Prediction. In Proc. 11th International Conference on Natural Computation (ICNC'15).DOI: [10.1109/ICNC.2015.7378141](https://doi.org/10.1109/ICNC.2015.7378141). (Co-author and slides presentation)

SKILLS

Theoretical Background: Machine Learning • Deep Learning • Natural Language Processing • Algorithms • Statistical Learning • Optimization Methods

DL and ML Libraries: Pytorch, Tensorflow, Theano, Keras, Scipy, Numpy, Pandas, SciKit learn

Programming: Python • C++ • \LaTeX • JavaScript • Matlab (basic) • Java (basic)

Data bases: SQL • MySQL • PostgreSQL • Xquery • neo4j

Operating Systems: Unix • Linux • Windows • Mac OS.

Languages: Italian (mother tongue) • English (IELTS 6.5) • Chinese (basic)

THESIS

Question Dependent Recurrent Entity Network for Question Answering: Master degree thesis: a memory network model for question answering that requires reasoning.

- extensive literature review of question answering models.
- modified and improved the core component of the original Recurrent Entity Network.
- experimented the proposed model in bAbI task and CNN news article datasets.
- improved state-of-the-art in bAbI tasks (1K setting)

Human Mobility and Disease Spread Simulation: Master degree final project: a disease spread simulation based on SIR model.

- implemented a computational model for contact social network.
- experimented with countermeasures to control the propagation, with a focus on the individual vaccination decision.
- simulated human mobility by flights to analyse how diseases spread in the world.

Facility location problem in a bi-dimensional mesh: Bachelor degree thesis: finding the optimal position of one or more facilities in a bi-dimensional mesh, using the Manhattan distance.

- found the optimal position of a maximum of two facilities with a closed formula
- placed three facilities using two heuristic algorithms: one finds an almost optimal solution with a quadratic cost, and the other one finds a good approximation with a linear cost

PROJECTS

Neural Network: An implementation of a Feed-Forward Neural Network using Theano.

- implemented Momentum and L2 regularization
- benchmarked using MONKS datasets, and compared to a Keras implementation, a linear model and a SVM/SVR (using scikit-learn)
- implemented a K-cross fold validation

Jacobi Method: A parallel version of the Jacobi Iterative Method.

- implemented three versions of the code using C++: sequential, Pthread based, and using FastFlow library
- evaluated code version using different matrix sizes, and measures (e.g., Completion Time, Scalability, Speed up, and Efficiency).
- conducted experiments using a Xeon Phi coprocessor (60 cores 4 contexts)

PythonITA: A fork of the Cpython repository to use Italian keywords as native constructors.

- modified the language interpreter, such as: the EBNF grammar (i.e. adding new production), the AST, and the built-in functions.
- modified the IDLE to highlight and predict the new added words.

Dynamic HTML render and a Recursive Descent Parser: Implementation of a Web Components library similar to React.JS.

- implemented an efficient representation of a Virtual DOM
- optimised the DOM element render in the HTML page.
- implemented a recursive descent parser to express components in JSX.

TagCloud Sentimental Analysis: A data visualization challenge organised by FWD Hong Kong.

- designed a Tagcloud visualization based on Google Books Ngram.
- showed the word size based on chronological relevance, and displayed the words polarity (positive or negative sentiments) with colours.

Others have a look on my personal [website](#) and my [GitHub](#).

VOLUNTEER ACTIVITIES

Mentor

Feb 2016 – Jun 2017

A volunteering activity to teach programming languages to children (mostly Scratch and Python). Pisa CoderDojo is part of the CoderDojo international initiative. I was also one of the organizers of the first [Toscana DojoCon](#) held in Pisa.

CODERDOJO

Pisa, IT