



David Semedo

PH.D. CANDIDATE - RESEARCH ASSISTANT · MULTIMODAL DEEP LEARNING

Lisbon, Portugal

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Summary

Ph.D. candidate, researching neural-based temporal multimodal embedding spaces, towards computationally bridging vision and language. In this topic, I address the semantic gap between visual and textual modalities, by modelling cross-modal data interactions over time.

Expertise and Interests : Multimodal machine learning. Neural-based Representation Learning. Computer vision and natural language processing methods for video, image and text modelling. Multimedia Understanding. My research interests lie around the field of multimedia understanding, namely in the intersection of computer vision and natural language processing, neural networks and data mining.

Work Experience

Research Assistant - GoLocal Project (CMUP-ERI/TIC/0046/2014)

Jan. 2019 - PRESENT

NOVA SCHOOL OF SCIENCE AND TECHNOLOGY

Lisbon, Portugal

- Researching temporal multimodal deep learning methods for cross-modal embedding learning and retrieval.
- Neural networks optimization strategies for embedding learning.

Research Assistant - COGNITUS H2020 project (Ref.687605)

Jan. 2016 - Dez. 2018

NOVA SCHOOL OF SCIENCE AND TECHNOLOGY

Lisbon, Portugal

- Researching Deep Learning and Machine Learning methods for multimodal (images/video and text) content semantic analysis and retrieval.
- Neural Cross-modal Representation Learning;
- Temporal Multimodal Representations;
- Data mining from social-media;
- Collaboration with BBC R&D, Queen Mary University, Vitec, FORTHNet, FORTH, ARRIS-Pace.

Lab Instructor - LxMLS 2016

July 2016

INSTITUTO SUPERIOR TÉCNICO, UNIVERSIDADE DE LISBOA

Lisbon, Portugal

- Lab Instructor for Lisbon Machine Learning School 2016 (<http://lxmls.it.pt/2016/>).

Research Assistant - Restrict to Plan (QREN) Project (Ref.34091)

Jul. 2014 - Sep. 2015

NOVA SCHOOL OF SCIENCE AND TECHNOLOGY

Lisbon, Portugal

- Modelling of Vehicle Scheduling Problems: Assignment and optimization of resources (vehicles) for a public transport bus company;
- Stochastic optimization strategies for large combinatorial problems;
- CPU Parallelization techniques for NUMA-based clusters;
- Collaboration with TECMIC.

Linux Distribution Developer and Maintainer

Jan. 2013 - Jul 2013

CAIXA MÁGICA SOFTWARE

Lisbon, Portugal

- Debian Packages Full Cycle: creation, compilation, testing and deployment;
- Development of a Debian-based educational Linux distribution - Openmillenium Project;
- Responsible for the administration of Caixa Mágica distributions: package updates integration/compilation and deployment.

Junior Research Assistant

Feb. 2013 - May 2013

NOVA SCHOOL OF SCIENCE AND TECHNOLOGY

Lisbon, Portugal

- Intrusion tolerant routing protocols for Ad-hoc Wireless Sensor Networks (IEEE 802.15.4). Advised by Prof. Henrique Domingues.

Education

NOVA School of Science and Technology

2016 - 2020(Expected)

PH.D. CANDIDATE, COMPUTER SCIENCE

- Topic: Temporal Neural Cross-modal Embeddings;
- Advisor: João Magalhães.

NOVA School of Science and Technology

2013 - 2015

M.Sc. COMPUTER SCIENCE AND ENGINEERING

18 out of 20

- Thesis: *A Public Transport Bus Assignment Problem: Parallel Metaheuristics Assessment*;
- Advisors: Pedro Barahona and Pedro Medeiros.

Publications

- Marcelino, G., D. Semedo, A. Mourão, S. Blasi, M. Mrak, and J. Magalhães, **A Benchmark of Visual Storytelling in Social Media**, Proceedings of the 2019 ACM on International Conference on Multimedia Retrieval (ICMR), 2019, Ottawa, Canada
- Semedo, D. and J. Magalhães, **Dynamic-Keyword Extraction from Social Media**, European Conference on Information Retrieval (ECIR), 2019, Cologne, Germany (**CORE A**)
- Semedo, David and Joao Magalhaes, **Cross-Modal Subspace Learning with Scheduled Adaptive Margin Constraints**, Proceedings of the 27th ACM International Conference on Multimedia, 2019, Nice, France (**CORE A***)
- Semedo, David and Joao Magalhaes, **Diachronic Cross-Modal Embeddings**, Proceedings of the 27th ACM International Conference on Multimedia, 2019, Nice, France (**CORE A***)
- Awad, George, Asad Butt, Keith Curtis, Yooyoung Lee, Jonathan Fiscus, Afzad Godil, David Joy, Andrew Delgado, Alan Smeaton, Yvette Graham, et al., **TRECVID 2018: Benchmarking video activity detection, video captioning and matching, video storytelling linking and video search**, Proceedings of TRECVID 2018, 2018
- Semedo, D. and J. Magalhaes, **Temporal Cross-Media Retrieval with Soft-Smoothing**, Proceedings of the 26th ACM International Conference on Multimedia (ACM MM), 2018, Seoul, Republic of Korea (**CORE A***)
- Semedo, D., J. Magalhães, and F. Martins, **Inferring User Gender from User Generated Visual Content on a Deep Semantic Space**, 2018 26th European Signal Processing Conference (EUSIPCO), 2018, Rome, Italy
- Semedo, D. and J. Magalhães, **Convolutional Neural Networks for Medical Image classification - NovaSearch at ImageCLEFmed 2016 Subfigure Classification Task**, Working Notes of CLEF 2016 - Conference and Labs of the Evaluation forum, 2016, Évora, Portugal
- Semedo, D., P. Barahona, and P. Medeiros, **Asynchronous Parallel Ant-Colony Optimization Strategies: Application to the Multi-Depot Vehicle Scheduling Problem with Line Exchanges**, INForum-Simpósio de Informática (INFORUM). 2015, Covilhã, Portugal

Awards

- 2019 **Finalist Top-3**, AIIA - Altice Innovation Award 2019: **Powering Live Event-Plots with Media AI**.
 2019 **Student Travel Grant**, ACM Multimedia 2019.

Nice, France

Activities

Seminar Talk

TITLE: BRIDGING VISION AND LANGUAGE OVER TIME WITH NEURAL CROSS-MODAL EMBEDDINGS, NOVA LINC'S SEMINAR.

2020

Student Volunteer at ACM Multimedia conference.

Nice, France

2019

Poster Presentation at 2nd NOVA Science day

NOVA SCIENCE DAY

Lisbon

2019

<https://www.unl.pt/agenda/geral/nova-science-day-2019-2o-encontro-de-ciencia-da-nova>

Poster Presentation at Encontro Ciência

Lisbon

ANNUAL SCIENCE AND TECHNOLOGY MEETING FOR PORTUGUESE RESEARCHERS.

2016-2019

Organizer of TRECVID 2018 Linking Task: Social Media Video Storytelling

Gaithersburg, MD, USA

TRECVID IS THE PREMIER ANNUAL INTERNATIONAL WORKSHOP EVENT FOR EVALUATING CONTENT-BASED RETRIEVAL OF MULTIMEDIA AND DIGITAL VIDEO

Nov. 2018

- Goal of the task: Advance the area of visual summarization, with collaborative videos, images and texts available from professional media and social-media users. (<https://www-nlpir.nist.gov/projects/tv2018/Tasks/lnk/>).

EXPO FCT

SCIENCE FAIR SHOWCASING THE UNIVERSITY RESEARCH FOR HIGH-SCHOOL STUDENTS.

2012, 2016-2019

Program Committee and Reviewing Activities

2019	Program Committee Member - Reviewer , ACM Multimedia (ACM MM)	Nice, France
2018	Reviewer , ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)	Michigan, USA
2018	Reviewer , ACM International Conference on Multimedia Retrieval (ICMR)	Yokohama, Japan
2018	Reviewer , International Conference on Theory and Practice of Digital Libraries (TPDL)	Porto, Portugal
2017	Reviewer , ACM International Conference on Multimedia Retrieval (ICMR)	Bucharest, Romania
2017	Reviewer , IEEE International Conference on Multimedia and Expo (ICME)	Hong Kong
2016	Reviewer , ACM International Conference on Multimedia Retrieval (ICMR)	New York, USA

Teaching

2018	Web Search and Data Mining , M.Sc. Computer Science course
2015	Algorithms and Data Structures , B.Sc. Computer Science course
2014	Algorithms and Data Structures , B.Sc. Electrical and Computer Engineering course

Computer Literacy

Languages

- **Main Programming Languages (Proficient level):** Python, C/C++, Java, SQL;
- **Programming Languages:** MATLAB, Javascript, OCaml, Prolog, Shell Scripting, Assembly.

Deep Learning, Machine Learning and Data Science

- **Deep Learning:** Keras, Tensorflow, Theano;
- **Machine Learning and Data Science:** Python ML stack: Scipy+Pandas+Scikit-learn+Matplotlib, Statsmodels, XGBoost, Scrapy;
- **Vision:** OpenCV, Scikit-image, FFmpeg;
- **NLP:** NLTK Toolkit, Gensim, SpaCy, Tesseract (OCR), Stanford POS Tagger, Stanford NER, WordNet.

Big Data - Parallel/Distributed/Cloud Computing Libraries and Frameworks

- MPI, OpenMP, HTCondor, Hadoop, Spark, RMI;
- Cloud: Amazon AWS + S3.

Other Frameworks and Technologies

- LaTeX, RabbitMQ, Docker (Docker Compose), Elasticsearch, Android, GIT.

Web Development

- **Frameworks:** Django, Flask, Ruby on Rails;
- HTML/XHTML, XML, CSS, JQuery.

Operating Systems

- Linux (Debian, CentOS), Windows

Training Courses

2016	Statistical Learning , Prof. Mário Figueiredo, IST-UL	19 out of 20
2015	Scalable Machine Learning , BerkeleyX CS-190.1x, edX	91%
2014	Machine Learning , Prof. Andrew Ng, Stanford University, Coursera	100%
2013	Quantum Mechanics and Quantum Computation , CS-191x, BerkeleyX, edX	91%
2013	Coding the Matrix: Linear Algebra Through Computer Science Applications , Brown University, Coursera	100% (w/distinction)