ADRIÀ CASAMITJANA

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EDUCATION

IDEAI Research Center, UPC-BarcelonaTech October 2015 - Present
PhD candidate in Signal Processing and Machine Learning *Barcelona, Spain*

Kungliga Tekniska Högskolan (KTH) September 2013 - June 2015
Master of Science in Wireless Systems *Barcelona, Spain*

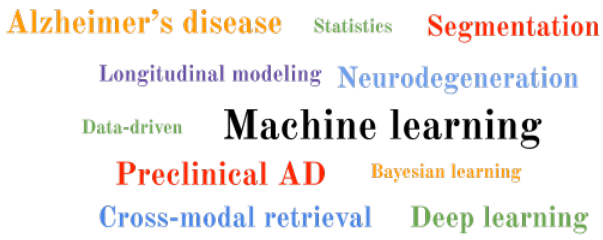
I graduated from the Wireless Systems and Signal Processing department as a part of the double-degree program.

Escola Tècnica Superior de Telecomunicacions de Barcelona (ETSETB) September 2009 - June 2015
Telecommunications Engineering (BSc. and MSc.) *Barcelona, Spain*

I graduated from the Signal Theory and Communications department with an overall percentage of 8.2/10.

MAIN RESEARCH INTERESTS AND EXPERTISE

My main area of expertise is medical image analysis using advanced modeling techniques. More precisely, my research has been focus in applying **statistical and machine learning** techniques for applied neuroimaging analysis: on one hand, the development of new methodology to study the **early development of Alzheimer's disease** and, on the other hand, investigating the use of **neural networks** for brain lesion segmentation.



PROJECTS AND THESES

Study of early stages of Alzheimer's disease using MRI and machine learning To be defended in 2019
PhD thesis

Supervisor: Dr. Verónica Vilaplana
The central topic of the thesis is the development of techniques to study preclinical stages of Alzheimer's disease using MRI. In this thesis I propose to use machine learning and MRI for clinical trial enrichment. Moreover, I have developed a toolbox for nonlinear analysis of neuroimaging. Finally, I have investigated the effect of AD pathological markers on brain MRI.

New insights on speech signal modeling in a Bayesian framework approach May, 2015
MSc thesis

Supervisor: Dr. Saikat Chatterjee
Link: https://bit.ly/2HU2BYa
The project provide new methodological approaches to speech modelling based on sparse representations and using Bayesian formulation. First, a new representation of the speech signal using line spectral frequencies (LSF) is presented together with extensive stability analysis. Secondly, we develop a new Bayesian framework is used for a speech generative model using a time-varying linear prediction (TVLP) model. Finally, we present the theoretical basis for speech denoising using Bayesian formulation.

60 GHz Wireless Communications Project June, 2014
Group project

Supervisor: Dr. Senay Negusse
Group project developed as a part of the MSc. programme. We designed, implemented and tested different wireless communication systems at 5GHz and 60 GHz frequencies using Universal Software Defined Radio (USRP) equipment.

ACADEMIC PUBLICATIONS

Journal publications

- A. Casamitjana, P.M. Petrone, A. Tucholka, C. Falcon, S. Skouras, S JL. Molinuevo, V. Vilaplana, JD. Gispert, "MRI-Based Screening of Preclinical Alzheimer's Disease for Prevention Clinical Trials", *Journal of Alzheimer's disease*, vol. 64, no. 4, pp. 1099-1112, 2018.
- P.M. Petrone*, A. Casamitjana*, C. Falcon, M. Artigues, G. Operto, R. Cacciaglia, J.L. Molinuevo, V. Vilaplana, J.D. Gispert, "Prediction of amyloid pathology in cognitively unimpaired individuals using voxelwise analysis of longitudinal structural brain MRI", *Alzheimer's Research & Therapy*, (Accepted, 2019).
- L. Wang, D. Nie, G. Li, ..., A. Casamitjana, ..., "Benchmark on Automatic 6-month-old Infant Brain Segmentation Algorithms: The iSeg-2017 Challenge", *IEEE transactions on medical imaging*, 2019
- H.J. Kuijf, J.M. Biesbroek, ..., A. Casamitjana, ..., "Standardized assessment of automatic segmentation of white matter hyperintensities; results of the wmh segmentation challenge", *IEEE transactions on medical imaging*, 2019

Conferences and workshops

- A. Casamitjana, V. Vilaplana, P.M. Petrone, J.L. Molinuevo, J.D. Gispert, "Shared Latent Structures Between Imaging Features and Biomarkers in Early Stages of Alzheimers Disease", *International Workshop on PRedictive Intelligence In MEdicine*, pp. 60-67, 2018
- A. Casamitjana, M. Catà, I. Sánchez, M. Combalia,V. Vilaplana, "Cascaded V-Net using ROI masks for brain tumor segmentation", *International MICCAI Brainlesion Workshop*, pp.381-391, 2017
- A. Casamitjana, S. Puch, A. Aduriz, V. Vilaplana, "3D Convolutional Neural Networks for Brain Tumor Segmentation: a comparison of multi-resolution architectures", *International Workshop on Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries* , pp. 150-161, 2016
- A. Casamitjana, M. Sundin, P. Ghosh, S. Chatterjee, "Bayesian learning for time-varying linear prediction of speech", *23rd European Signal Processing Conference (EUSIPCO)*, IEEE, pp.325-329, 2015

TEACHING EXPERIENCE

Universitat Politècnica de Catalunya (UPC) September 2017 - January 2019
Teaching assistant *Barcelona, Spain*

Teaching assistant on the undergraduate course "Signals and Systems".

Universitat Politècnica de Catalunya (UPC) September 2016 - June 2018
Teaching assistant *Barcelona, Spain*

Teaching assistant on the undergraduate course "Image and Video Analysis".

Kungliga Tekniska Högskolan (KTH) January-April 2015
Teaching assistant *Stockholm, Sweden*

Teaching assistant on the graduate course "Speech signal processing".

TECHNICAL AND PERSONAL SKILLS

- **Statistics and Machine Learning**: • Statistical testing and linear mixed models • Latent modeling and representation learning (PCA, CCA, PLS, NMF, clustering) • Classification (kNN, Logistic Regression, SVM, Random Forest, Neural networks, ensemble methods) • Regression (GLM, GAM, SVR, Regression Splines) • Graph theory • Multi-task learning • Bayesian learning.
- **Deep learning**: • Representation learning (autoencoder (AE), adversarial autoencoder (AAE), variational autoencoder (VAE)) • Segmentation (UNet, VNet, Mask R-CNN, etc...) • Libraries: PyTorch, Tensorflow and Keras.
- **Programming skills:** • Proficient in Python, Matlab, C, C++, Bash and TeX • Good knowledge of R and Java • Version control system: Git • Unix systems.

FUNDING/AWARDS

- **Formación Profesorado Universitario (FPU) Research Fellowship**: 4-year funding from the Spanish "Ministerio de Educación, Cultura y Deporte (MECD)" (FPU14/05988)
- **Catalan Agency of University and Reserach Management (AGAUR) Scholarship**: 6-month funding for MSc. studies abroad from the Generalitat de Catalunya (Spain).
- **Erasmus Scholarship**: 6-month funding for exchange studies from the Erasmus program of the European Union (EU)
- **BSc. award**: ranked 3rd most successful student during my Bachelor studies, with some funding for the first year of master studies.

OTHER INTERESTS AND EXTRA-CURRICULAR ACTIVITIES

- **Sports:** I am an enthusiast trail runner and climber, with increasing interest towards hiking. I am a member of an orienteering club.
- **Music:** I have been playing in two rock bands playing in many regional concert halls/pubs. With one of them we have recorded two LP in professional studies. In my free time I also love to play the guitar and the drums.
- **Political/Social science:** I love to read, think and discuss about the current organization system in our society from different perspectives (political, economical, sociological).