Ricardo G. Sousa

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Education

- **Doctoral Studies** *Faculdade de Engenharia, Universidade do Porto, Portugal*
  Doctoral Program in Electrical and Computer Engineering *2012*
  - **Title:** Multicriteria Learning on Ordinal Data
  - **Supervisors:** Prof. Doctor Jaime S. Cardoso and Prof. Doctor Joaquim F. P. da Costa
  - **Area of Study:** Machine Learning
- **Master Studies** *Faculdade de Ciências, Universidade do Porto, Portugal*
  Mathematical Engineering *2008*
  - **Title:** Automatic Aesthetic Evaluation of Breast Cancer Conservative Treatment
  - **Supervisors:** Prof. Doctor Jaime S. Cardoso and Prof. Doctor Joaquim F. P. da Costa
  - **Area of Study:** Computer Vision, Machine Learning
- **Graduate Studies (*Licenciatura*)** *Faculdade de Ciências, Universidade do Porto, Portugal*
  Computer Science *2007*
  - **Title:** Night Sky Simulator (Internship in the industry)
  - **Area of Study:** Computer Graphics, Image Processing

Software Development and Support Material

- **Code**
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  - Immunogold Particles Detection and Recognition (in Python and Matlab®);
  - Reduced Set: Smaller training datasets for a reduced number of Support Vectors (in SVMs) and faster prediction times (in Matlab ®);
  - Reject Option: Automatically discard instances for human revision (in Matlab®);
  - OCI (Ordinal Classification Index): A performance measure for ordinal classifiers (in Matlab®);

- **Datasets**
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  - Transmission Electron Microscopy Imaging (Immunogold Particles);

Professional Experience: Industry

- **Data Science Manager** **Farfetch**
  March, 2019→

  Automatic intelligent systems to augment customer experience at Farfetch platform.

  - Responsibilities and Achievements:
    * Providing disruptive thinking and products to pave the way for cutting-edge solutions within Farfetch;
    * Collaboration with different product owners and business;
    * Scientific Project Management;
    * PhD. and MSc. students supervisor.

- **Lead Data Scientist** **Farfetch**
  February, 2017→ February, 2019

  Working on new automatic intelligent systems to augment customer experience at Farfetch platform.

  - Responsibilities and Achievements:
    * Providing disruptive thinking and products to pave the way for cutting-edge solutions within Farfetch;
    * Data Science guild within Search Department;
    * Collaboration with different product owners and business;
    * Reporting and Analysis with respect to key performance indicators;

- ∗ Products ranking (learning to rank) towards an improved customer engagement and experience;
- ∗ Computer Vision (e.g., image representation, object detection & categorization);
- ∗ Natural Language Processing (e.g., word embeddings, named entity recognition);
- ∗ Design and implement Machine Learning and Computer Vision algorithms for ranking and image retrieval (multiple models continuously being tested);
- ∗ Mentoring DS elements within Search Department to rapidly launch data driven Proof Of Concepts and delivering Minimum Viable Products (MVPs) into production;
- ∗ Recruitment and mentoring new joiners through *Bootcamp* projects;
- ∗ Machine Learning Evangelist;
- ∗ Scientific and Technical writer;
- ∗ PhD. and MSc. students supervisor.
- – Tech Stack:

  Programming Python, bash

  OS Linux

  Data Science & Visualization Sklearn, TensorFlow, PyTorch, seaborn, matplotlib

  Data Engineering SQL, Mongo, Redis, Cassandra, Docker, Jenkins (CI&CD)

- **Data Scientist**   **Farfetch**

  October, 2015 - January, 2017

  Working on new automatic intelligent systems to augment customer experience at Farfetch website.

  - – Responsibilities and Achievements:
    - ∗ Design and implement Machine Learning and Computer Vision algorithms (python) for ranking and image retrieval (multiple models variations currently being tested in Farfetch website);
    - ∗ Maintain SQL jobs to rank and optimize products visibility according to given business rules;
    - ∗ Collaboration with different product owners and business;
    - ∗ Services (for ranking and image similarity) concept design and implementation.

Professional Experience: Research & Development

- **PostDoc Researcher**   **INEB**

  Collaborator in R&D   *2014-2015*

  - – Reusable Deep Neural Networks (PTDC/EIA-EIA/119004/2010).
  - – Responsibilities:
    - ∗ Major: Develop and Implement novel Transfer Learning algorithms (with Deep Neural Networks);
    - ∗ Major: Collaboration with Biomedical Experts;
    - ∗ Project Management Assistance;
    - ∗ Students Supervision;
    - ∗ Research Grants and Funds Raising.

- **Researcher**   **Instituto de Telecomunicações**

  Collaborator in R&D   *2012-2014*

  - – Computer Assisted Gastroenterology Examination (CAGE) (FCT, PTDC/EIA-CCO/109982/2009).
  - – Responsibilities:
    - ∗ Major: Develop and Implement novel Computer Vision algorithms for cancer recognition;
    - ∗ Students Supervision;
    - ∗ Research Grants and Funds Raising.

- **Trainer**   **Universidade do Porto**

  2012

  One week course about Intermediate Excel knowledge: formulas, lists, conditional formatting, filter, images, macros and forms.

- **Researcher**   **INESC Porto**

  Collaborator in R&D   *2008-2012*

- 3D BCT (3D Models for Aesthetic Evaluation and Prediction of Breast Cancer Interventions) (FCT, PTDC/SAU-ENB/114951/2009).
- Semantic PACS (Picture Archiving and Communication System with Semantic Search Engine) (FCT, Project n.º 3472).
- Advanced Objective Method for the Evaluation of the Aesthetical Result of Breast Interventions (FCT, PTDC/EIA/64914/2006).
- Responsibilities:
  * Major: Develop and Implement novel Computer Vision (Image Processing and Machine Learning) algorithms;
  * Students Supervision;

Professional Experience: Teaching

- **Invited Professor**
  CESPU - Cooperativa de Ensino Superior Politécnico e Universitário, CRL   Fall 2012
  - Image and Signal Processing in Magnetic Resonance and Computed Tomography.

- **Teaching Assistant**
  Faculdade de Engenharia, Universidade do Porto   Fall 2009
  - Computer Aided Diagnostic Class with an introduction to Machine Learning: PRTools, Bayesian Classification, Non-Parametric, Parametric Supervised Learning, Linear Classification and Support Vector Machines.

Professional Experience: International Internship and Academic Advising

- **International Internship**   **Universidade Federal do Ceará, Fortaleza, Brazil**
  March-June 2011
  Internship under the Program MOBILE CNPq - FEUP. The aim of this internship was to study, develop and incorporate new **reject option** algorithms in the SINPATCO[1] (*Sistema Inteligente para Diagnóstico de Patologias da Coluna Vertebral*) system.

- **Advising**
  Master Theses
  - José Marcelino, UC, *SmartSearch – Search Engine with Natural Language Processing*, (2018);
  - Sofia Fernandes, UA, *Automatic Recognition of Microglia Cells*, (2015);
  - Daniel Dias, ISEP, *Cellular Structure Identification on C.Elegans*, (2015);
  - Sara Francisco, FEUP, *Automatic Descriptor Learning for Gastroenterology Images*, (2013/2015);
  - João Costa, FEUP, *Ensemble Methods in Ordinal Data Classification*, 2013.
  - Gustavo Augusto, FCUP, *Computer Aided Diagnosis for Breast Cancer*, 2013.
  - Bruno Mendes, FCUP, *Narrow-band Image Processing for Gastroenterological Examinations*, 2012.
  - Ezilda Almeida, FEUP, *Algoritmos de Classificação com a Opção de Rejeição*, 2010.
  - José Ramos, FEUP, *Algoritmos Colaborativos para Sistemas de Recomendação*, 2010.
  - Pedro Vitoriano, FEUP, *Avaliação Automática do Resultado de Intervenções Cirúrgicas*, 2009.

Core Skills

Programming (and Scripting) Languages: Bash, C, C++, HTML, Java, LaTeX, Matlab, PHP and Python.
Know-How: Machine Learning, Computer Vision and Artificial Intelligence.
Interests: Big Data and Data Mining.

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[1]Intelligent Diagnosis of Pathologies on the Vertebral Column

Scientific Contributions

- **Selected Works**

    - **R. Gamelas Sousa** , A. R. da Rocha Neto, J. S. Cardoso, and G. A. Barreto, "Robust classification with reject option using the self-organizing map," Neural Computing and Applications, 2015.
    - **R. Sousa** and Jaime S. Cardoso, "The Data Replication Method for the Classification with Reject Option," AI Communications, 26 (2013), no. 3, 281-302.
    - J. S. Cardoso and **R. Sousa** , "Measuring the performance of ordinal classification," International Journal of Pattern Recognition and Artificial Intelligence, 25 (2011), no. 8, 1173–1195.

Scientific Contributions

- **List of Publications**
  on Refereed Journals

    - **R. Gamelas Sousa** , A. R. da Rocha Neto, G. A. Barreto, "Reduced-Set Method for Support Vector Machines based on Reject Option," (*submitted*);
    - **R. Gamelas Sousa** , Tiago Esteves, Sara Rocha, Luis A. Alexandre, Paulo Monjardino, Joaquim M. de Sá, Francisco Figueiredo, Pedro Quelhas, Jorge M. Santos, Luis M. Silva, "Stacked Denoising Autoencoders and Transfer Learning for Immunogold Particles Detection and Recognition," (*submitted*);
    - **R. Gamelas Sousa** , Joaquim Marques de Sá, Luis A. Alexandre, Jorge M. Santos, Luis M. Silva, "Classifier Transfer Learning: A Survey Towards A Unifying View," (*submitted*);
    - **R. Gamelas Sousa** , A. R. da Rocha Neto, J. S. Cardoso, and G. A. Barreto, "Robust classification with reject option using the self-organizing map," Neural Computing and Applications, 2015;
    - **R. Sousa** and Jaime S. Cardoso, "The Data Replication Method for the Classification with Reject Option," AI Communications, 26 (2013), no. 3, 281-302;
    - J. S. Cardoso and **R. Sousa** , "Measuring the performance of ordinal classification," International Journal of Pattern Recognition and Artificial Intelligence, 25 (2011), no. 8, 1173–1195.

- **List of Publications**
  on Refereed Book Chapters

    - **R. Sousa** , Iryna Yevseyeva, Joaquim F. Pinto da Costa, and Jaime S. Cardoso, Multicriteria Models for Learning Ordinal Data: a literature review, Artificial Intelligence, Evolutionary Computation and Metaheuristics (AIECM) –In the footsteps of Alan Turing (Xin-She, ed.), 2012.

- **List of Publications**
  on Refereed International Conferences

    - J. Marcelino, J. Faria, L. Baía, and **R. Gamelas Sousa** , "A Hierarchical Deep Learning Natural Language Parser for Fashion," in KDD, 2018.
    - B. Quintino Ferreira, L. Baía, J. Faria, and **R. Gamelas Sousa** , "A Unified Model with Structured Output for Fashion Images Classification," in KDD, 2018.
    - **R. Gamelas Sousa** , T. Esteves, S. Rocha, F. Figueiredo, Pedro Quelhas, and L. M. Silva, "Automatic Detection of Immunogold Particles from Electron Microscopy Images," in ICIAR, 2015.
    - **R. Gamelas Sousa** , T. Esteves, S. Rocha, F. Figueiredo, J. M. de Sá, L. A. Alexandre, J. M. Santos, and L. M. Silva, "Transfer learning for the recognition of immunogold particles in TEM imaging," in IWANN, 2015.
    - **R. Sousa** , A. R. da Rocha Neto, G. A. Barreto, J. S. Cardoso, and M. T. Coimbra, "Reject Option Paradigm for the Reduction of Support Vectors," in ESANN, 2014.
    - **R. Sousa** , A. R. da Rocha Neto, G. A. Barreto, and J. S. Cardoso, "Classification with reject option using the self-organizing map," in ICANN, 2014.
    - C. Kandaswamy, L. M. Silva, L. M. Alexandre, **R. Sousa** , J. Santos, and J. M. de Sá, "Improving transfer learning accuracy by reusing stacked denoising autoencoders," in Proceedings of the IEEE SMC Conference, 2014.
    - **R. Sousa** , M. T. Coimbra, M.-D. Ribeiro, and P. Pimentel-Nunes, "Impact of SVM Multiclass Decomposition Rules for Recognition of Cancer in Gastroenterology Images," in Computer-Based Medical Systems (CBMS), 2013 IEEE 26th International Symposium on, pp. 405–408, June 2013.

- F. Magalhaes, **R. Sousa** , F. M. Araújo, and M. V. Correia, "Compressive sensing based face detection without explicit image reconstruction using support vector machines," in ICIAR, 2013
- **R. Sousa** , M. T. Coimbra, M.-D. Ribeiro, and P. Pimentel-Nunes, "Impact of SVM Multiclass Decomposition Rules for Recognition of Cancer in Gastroenterology Images," in CBMS, 2013.
- J. S. Cardoso, **R. Sousa** , and I. Domingues, "Ordinal Data Classification Using Kernel Discriminant Analysis: A Comparison of Three Approaches," in Proceedings of The Tenth International Conference on Machine Learning and Applications (ICMLA 2012), 2012.
- **R. Sousa** and J. S. Cardoso, "Ensemble of Decision Trees with Global Constraints for Ordinal Classification," in 11th International Conference on Intelligent Systems Design and Applications (ISDA 2011), 2011.
- A. R. R. Neto, **R. Sousa** , G. Barreto, and J. S. Cardoso, "Diagnostic of Pathology on the Vertebral Column with Embedded Reject Option," in Proceedings of Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA), 2011.
- A. Rebelo, J. Tkaczuk, **R. Sousa** , and J. S. Cardoso, "Metric Learning for Music Symbol Recognition," in The tenth International Conference on Machine Learning and Applications (ICMLA'11), 2011.
- **R. Sousa** , H. P. Oliveira, and J. S. Cardoso, "Feature Selection with Complexity Measure in a Quadratic Programming Setting" in Proceedings of The Fifth edition of the Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA 2011), 2011.
- J. S. Cardoso and **R. Sousa** , "Classification Models with Global Constraints for Ordinal Data," in Proceedings of The Ninth International Conference on Machine Learning and Applications (ICMLA 2010), 2010.
- J. P. da Costa, **R. Sousa** , and J. S. Cardoso, "An all-at-once Unimodal SVM Approach for Ordinal Classification," in Proceedings of The Ninth International Conference on Machine Learning and Applications (ICMLA 2010), 2010.
- J. S. Cardoso, **R. Sousa** , L. F. Teixeira, and M. J. Cardoso, "Breast Contour Detection with Stable Paths," in Biomedical Engineering Systems and Technologie, 2009.
- **R. Sousa** , B. Mora, and J. S. Cardoso, "An Ordinal Data Method for the Classification with Reject Option," in Proceedings of The Eighth International Conference on Machine Learning and Applications (ICMLA 2009), 2009.
- **R. Sousa** , J. S. Cardoso, J. F. P. da Costa, and M. J. Cardoso, "Breast Contour Detection with Shape Priors," in 2008 15th IEEE International Conference on Image Processing, (ICIP), 2008.

- **List of Publications**
  on Refereed Abstracts in International Conferences (selected works)

  - S. Costa, **R. Sousa** , A. Magalhaes, J. S. Cardoso, and M. J. Cardoso, "A Preliminary Model to the Automatic Prediction of Aesthetic Results in Breast Cancer Conservative Treatment," SIS 2010, 2010.
  - S. Costa, A. Magalhaes, **R. Sousa** , J. S. Cardoso, and M. J. Cardoso, "Prediction Model of Asymmetry in Breast Cancer Conservative Treatment (BCCT)," ORBS 2009, 2009.
  - S. Costa, **R. Sousa** , J. S. Cardoso, and M. J. Cardoso, "Prediction of the aesthetic result in breast cancer conservative treatment," IBCM-2, 2009.
  - A. Magalhães, **R. Sousa** , A. J. Moura, A. S. Comba, and M. J. a. Cardsoso, "Does the Technique of Immediate Reduction Mammaplasty for Breast Cancer Conservative Treatment only Depends Upon Tumour Location?," ORBS 2009, 2009.
  - T. Almeida, A. Magalhaes, F. Coelho, **R. Sousa** , J. S. Cardoso, and M. J. Cardoso, "Is Asymmetry Enough for the Aesthetic Evaluation of Breast Cancer Conservative Treatment (BCCT)?," ORBS 2008, 2008.

- **Service to the Scientific Community**
  as Reviewer

  - Journals: *Transactions on Neural Networks and Learning Systems, Transactions on Information Technology in Biomedicine* and *Neural Processing Letters.*
  - International Conferences: *dincon 2013, Conferência Brasileira de Dinâmica, Controle e Aplicações, 13th edition of the Ibero-American Conference on Artificial Intelligence, IBERAMIA 2012, International Conference on Hybrid Artificial Intelligence Systems, HAIS 2012, 11th International Conference on Intelligent Systems Design and Applications, ISDA 2011, 10th Brazilian Congress on Computational Intelligence, CBIC 2011* and *17th edition of the Portuguese Conference on Pattern Recognition, RecPad 2011.*

- **Service to the Scientific Community**
  as Member of Scientific Events Committee

    – Member of the Organizing Committee for the VISion Understanding and Machine intelligence (visum) School, Editions: 2015, 2014 and 2013.[2]

    – Local Technical Support for the 17th Portuguese Conference on Pattern Recognition, October 2011.[3]

    – Member of the Organization Committee for "Turning Subjective Into Objective": Cosmetic Breast Assessment of Local Treatment held at *Champalimaud* by *Fundação Champalimaud, INESC PORTO e Faculdade de Medicina da Universidade do Porto*, May 2011.[4]

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[2] http://www.fe.up.pt/visum
[3] http://www.fe.up.pt/recpad2011/
[4] http://medicalresearch.inescporto.pt/breastresearch/tsio2011/