Ricardo Cruz

- Machine learning specialist
- Computer vision specialist
- Programmer

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For the last few years, I have been working at INESC TEC – an institute that does both academic research and industry development. I have been doing both machine learning and computer vision, working in TensorFlow, PyTorch, and OpenCV.

I have just completed my Ph.D. in Computer Science (june 2021). During the Ph.D., I have been serving a few hours per week as a Teacher Assistant at the Faculty of Engineering, University of Porto, helping teach Python and C++. In 2021, I was awarded the Pedagogy Award based on student feedback.

Skills: Python · C · C++ · Java · R · MATLAB · TensorFlow · PyTorch · OpenCV · SQL · Git

Work Experience

Oct. 2015–Jul. 2021 | INESC TEC
Machine Learning Specialist

INESC TEC is an R&D institute whose headquarters are located in Porto. I collaborated in the following projects:

- **2020–2021 CadPath.AI:** high-performing computing plataform in collaboration with IMP for molecular diagnosis of cancer cells
- **2018–2020 CLARE:** low-cost mobile device for cervical cancer diagnosis in collaboration with Fraunhofer
- **2015–2017 NanoSTIMA:** medical machine learning systems, in collaboration with CINTESIS, FMUP and IBMC
- Internal awards
  - 2021 march: outstanding recognition award
    https://bip.inesctec.pt/en/especiaisdecorrida/ricardo-cruz-ctm-2/
  - 2018 sept: outstanding recognition award
    http://bip-archive.inesctec.pt/en/196/fora-de-serie.html

Sept. 2018–Aug. 2021 | FEUP
Teacher Assistant (part-time)

- Teaching Python (EIC0005) and C/C++ (EIC0012) for MIEIC
- 2021: received FEUP pedagogic award, voted by students

Mar.–Jul. 2015 | Flykt Startup

I was involved in a non-successful startup whose goal was to search for travel destinations. I was involved in the NLP part.

Education

2016–2021 | Ph.D. in Computer Science
University of Porto, Minho and Aveiro (joint degree)

- Thesis title: Re-thinking a Deep Learning Pipeline for Images
- Supervisors: Jaime S. Cardoso and Joaquim F. Pinto Costa
- 12 publications, 1 best paper award

2014–2015 | MSc in Mathematical Engineering
Faculty of Sciences, University of Porto

- Graduated with honors: 18 out of 20 points

2009–2012 | BSc in Computer Science
Faculty of Sciences, University of Porto

- Graduated with honors: 16 out of 20 points

Work Experience (cont'd)

Sept. 2014–Feb. 2015 | Research Grant
Mathematics Center of the University of Porto

Research on epidemiological models: from differential equations to stochastic simulations and cellular automata.

Some of my Workshops

May 2021 | IEEE Bioengeering Society (EMBS - ISEL)
Scikit-image and scikit-learn

Oct 2019 | DSPT Day
Lightning talk on class imbalance

August 2018 | Universidade Junior
"Escondidos nos Dados:" Teaching data science to highschool students

August 2018 | Porto Codes Meetups
Building a Neural Network

Sept 2017 | Porto Codes Meetups
Julia Programming Language

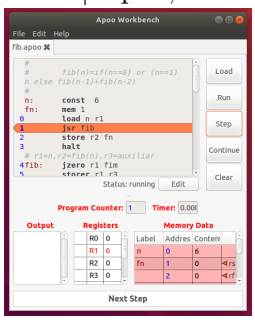
June 2017 | Python Meetup
NumPy and Scikit-Learn

Oct 2016 | FEUP Code Week
Python for scientific computing

Selected Open-Source Portfolio

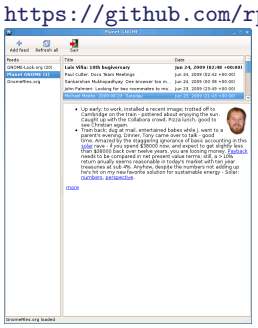
2017 | Avito NLP competition @ Kaggle
Bronze award for results and silver award for engagement

2010 | Apoo, a virtual machine



I helped with the development of Apoo (together with Profs Rogério Reis and Nelma Moreira), a virtual machine that is currently being used to teach Assembly. Apoo is written in Python and GTK+.

2009 | EatFeed
RSS/Atom reader written in C++ and GTK+
https://github.com/rpmcruz/eatfeed



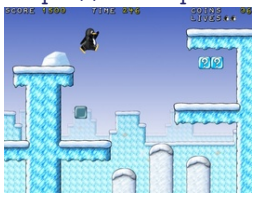
2006 and 2007 | Google Summer of Code

- 2007: LibreOffice dynamic layouts (C++)
- 2006: YaST port from GTK+ to Qt (C++)

2005 | J2ME and Android games
https://github.com/rpmcruz/android-games

Games written in Java Mobile Edition; more recently, I ported a couple of them to Android.

2005 | SuperTux, co-author
https://www.supertux.org/



While in high-school, I was part of the initial team developing this game. It is written in C++, SDL, and OpenGL.

- Find more of my open-source code at https://github.com/rpmcruz.
- Videos showing some of my work: https://www.youtube.com/channel/UCLS6OCVgk_qPohhUqSPvLJw.

Publications

These are my indexed publications (some publications in **bold** for emphasis).

1. 2021. "Ordinal Losses for Classification of Cervical Cancer Risk." T. Albuquerque, R. Cruz, J. Cardoso. PeerJ Computer Science.
2. **2021. "Background Invariance by Adversarial Learning." R. Cruz, R. Prates, E. Filho, J. Costa, J. Cardoso. 25th International Conference on Pattern Recognition (ICPR), IEEE.**
3. 2019. "Automatic Augmentation by Hill Climbing." R. Cruz, J. Costa, J. Cardoso. 28th International Conference on Artificial Neural Networks (ICANN), Springer.
4. **2019. "Averse Deep Semantic Segmentation." R. Cruz, J. Costa, J. Cardoso. 41st Engineering in Medicine and Biology Conference (EMBC), IEEE.**
5. 2019. "Insulator visual non-conformity detection in overhead power distribution lines using deep learning." R. Prates, R. Cruz, A. Marotta, R. Ramos, E. Filho, J. Cardoso. Journal Computers & Electrical Engineering, Springer.
6. 2018. "A Class Imbalance Ordinal Method for Alzheimer's Disease Classification." R. Cruz, M. Silveira, J. Cardoso. 2018 International Workshop on Pattern Recognition in Neuroimaging (PRNI), IEEE.
7. 2018. "Binary ranking for ordinal class imbalance." R. Cruz, K. Fernandes, J. Costa, M. Pérez Ortiz, J. Cardoso. Journal Pattern Analysis and Applications, Springer.
8. **2018. "Deep image segmentation by quality inference." K. Fernandes, R. Cruz, J. Cardoso. International Joint Conference on Neural Networks (IJCNN), IEEE.**
9. 2017. "Constraining type II error: building intentionally biased classifiers." R. Cruz, K. Fernandes, J. Costa, J. Cardoso. International Work-conference on Artificial Neural Networks (IWANN), Springer.
10. 2017. "Fine-to-coarse ranking in ordinal and imbalanced domains: an application to liver transplantation." M. Pérez-Ortiz, K. Fernandes, R. Cruz, J. Cardoso. International Work-conference on Artificial Neural Networks (IWANN), Springer.
11. 2017. "Combining ranking with traditional methods for ordinal class imbalance." R. Cruz, K. Fernandes, J. Costa, M. Pérez-Ortiz, J. Cardoso. International Work-conference on Artificial Neural Networks (IWANN), Springer.
12. 2017. "Ordinal class imbalance with ranking." R. Cruz, K. Fernandes, J. Costa, M. Pérez-Ortiz, J. Cardoso. Iberian conference on pattern recognition and image analysis (Ibpria), Springer.
13. **2016. "Tackling class imbalance with ranking." R. Cruz, K. Fernandes, J. Costa, J. Cardoso. International Joint Conference on Neural Networks (IJCNN), IEEE.**

My Google Scholar: https://scholar.google.pt/citations?user=pSFY_gQAAAAJ