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)
- 2021: received FEUP pedagogic award, voted by students

2014 (6 months) | Research Grant
Mathematics Center of the University of Porto

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

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

2013–2015 | 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

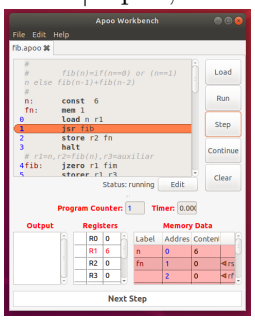
- Graduated with honors: 16 out of 20 points

Selected Open-Source Portfolio

2017 | Avito NLP competition @ Kaggle

Bronze award for results and silver award for engagement

2010 | Apoo, a virtual machine

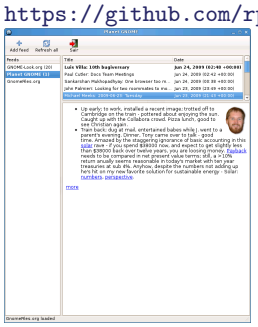


I helped with the development of Apoo (together with Profs Rogério Reis and Nelma Moreira), a virtual machine that is currently being used to teach Assembly. Apoo is written in Python and GTK+.

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

1. **2021:** Ordinal Losses for Classification of Cervical Cancer Risk
   T. Albuquerque, R. Cruz, J. Cardoso. PeerJ Computer Science [IF: 3.09]
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 [CAPES: A2]
3. **2019:** Automatic Augmentation by Hill Climbing
   R. Cruz, J. Costa, J. Cardoso. 28th International Conference on Artificial Neural Networks (ICANN), Springer [CAPES: B1]
4. **2019:** Averse Deep Semantic Segmentation
   R. Cruz, J. Costa, J. Cardoso. 41st Engineering in Medicine and Biology Conference (EMBC), IEEE [CAPES: A2]
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 [IF: 2.66]
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 [IF: 1.51]
8. **2018:** Deep image segmentation by quality inference
   K. Fernandes, R. Cruz, J. Cardoso. International Joint Conference on Neural Networks (IJCNN), IEEE [CAPES: A2]
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 [CAPES: B1]
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 [CAPES: B1]
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 [CAPES: B1]
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 [CAPES: B2]
13. **2016:** Tackling class imbalance with ranking
    R. Cruz, K. Fernandes, J. Costa, J. Cardoso. International Joint Conference on Neural Networks (IJCNN), IEEE [CAPES: A2]