Cristian Marian VICAS, PhD

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Personal: ----------
Date and place of birth: ----------

Computer Science Engineer

Hands on, application oriented researcher in **Computer Vision**, focused on 2D image processing and machine learning, for the past 10 years. With over 20 published papers, I usually follow the research beyond the accepted boundaries imposed by the field or by the topic. I am not afraid to go outside my comfort zone to meet my goals!

As a software engineer I always try to find the **balance** between applying the **best practices** and **getting things done**. I follow Eric Ries' **lean** methodology both in machine learning and startup projects.

I have a strong background in algorithms, software engineering and extensive experience in scientific Python. In the past I also worked in Matlab, Java and C. I have working knowledge on distributed and high performance computing.

I am a people person, with strong communication and mentoring skills, always willing to improve myself, to tackle new fields and to improve current state-of-the-art.

Skills and expertise

Core skills:
Image processing: feature detection, multiresolution and textural image analysis
Machine learning: Deep learning with focus on Computer Vision, model performance assessment
Applied fields: medical image processing, remote sensing, multispectral imaging, scanning electron microscopy, low contrast/noisy images,
Comfortable coding in Python

Solid knowledge: Software architecture, design patterns, object oriented programming
Fundamental algorithms and data structures (lists, trees, graphs and operations on them)
Working knowledge:
Geospatial data processing, Docker, RabbitMQ, Linux, C/C++, NoSql, RaspberryPi, CUDA, Test Driven Development, Lean methodology, Android

Professional Experience

Software engineer: 2018 – present	Laif Computation SRL Livezeni Str., No. 10, Cluj-Napoca (Romania)

Machine learning R&D

In the future, computers will interface directly with the brain. Our company develops a brain implant and I am responsible for signal processing and machine learning for it.

Software engineer: 2014 – 2018	Catalysts GmbH Henri Barbusse Str, No. 44-46, Cluj-Napoca (Romania)

With my head in the clouds but with the feet on the ground

I developed a machine learning system that processed large, multispectral images. I contributed to the scientific parts of the grant proposal, software design, implementation and scientific reporting. I coded mostly in Python using *gdal*, *scikit-learn* and *tensorflow* libraries.

Senior Lecturer	2013 – 2016	Technical University of Cluj-Napoca
Lecturer	2011 – 2013	Computer Science Department
PhD student	2007 – 2011	Memorandumului no 28, Cluj Napoca (Romania)
Independent contractor	2006 – 2007	Tel: +40 264 401 200

Building computer vision algorithms that capture the human expertise

The research area was Computer Vision, focused on algorithms that work on complex and cluttered 2D images [1]. For the PhD thesis I built a framework for medical imaging to perform texture analysis on liver ultrasound images. The goal was to non-invasively diagnose liver pathologies. I proved that the texture analysis is less sensitive to the actual disease but more sensitive to other factors like liver anatomical particularities [2]

and the skill level of the human expert that operates the system [3]. I developed alternative means of accurately detect the pathologies [4] and replaced the human expert with an automated system [5]. The research was funded by three research grants and a scholarship. I coded in *C++* and *Matlab*.

Freelancing and personal projects

Searching for the unicorn, with a taste in hardware

Most of the time I have side projects, mostly for fun or to learn. Sometimes, with my friends we adventure into a startup. With a lean mindset, I constantly improve my failure speed, trying to learn faster (and cheaper). Most notable projects:

- Visual fashion search engine. Startup. Deep learning visual search on top of a web crawler.
- Steatosis detection from liver biopsy slides. Research. Deep learning on medical imaging [6]
- Home automation system. Controls heating and monitors various devices. I used RaspberryPi to develop a Python control server and an Android app as frontend. Details: **ml-visoft.blogspot.ro**
- Kaggle: Once in a while I enjoy a challenge. My profile: **kaggle.com/visoft**

Education and training

Formal education:

- **PhD** in Computer Science (2007-2011), **Bachelor** (2002-2007): Technical University of Cluj-Napoca, Computer Science Department, Memorandumului Str no. 28, Cluj Napoca, Romania
- **Doctor-physician** (1997-2003): "Iuliu Haţieganu" University of Medicine and Pharmacy Victor Babeş Street, no. 8, 400012 Cluj-Napoca (Romania)

Informal education:

- Design of Computer Programs: **Udacity**, Peter Norvig
- Functional Programming Principles in Scala: **Coursera**, Martin Odersky
- Pattern-Oriented Software Architectures for Concurrent and Networked Software: **Coursera**, Douglas. C. Schmidt
- Introduction to Parallel Programming: **Udacity**, David Luebke, John Owens, Mike Roberts et al.
- Heterogeneous Parallel Programming: **Coursera**, Wen-mei W. Hwu
- Introduction to Artificial Intelligence: **Udacity**, Sebastian Thrun and Peter Norvig
- Machine Learning: **Coursera**, Andrew Ng

Other

- Languages: Romanian (Native), English (certified C1/B2 by LCCI)
- **Reviewer** at IEEE-T Intelligent Transportation Systems, IEEE-T Image Processing, Medical & Biological Engineering & Computing, IEEE International Conference on Intelligent Computer Communication and Processing
- Three year BD scholarship from the Romanian National Council of Scientific Research
- Professional visit to Catholic University of Leuven, Belgium, Medical Imaging Research Center
- Small contributions to the world: **github.com/cristi-zz**
- Hobbies: Skiing, SF literature, cryptocurrencies, astronomy.

Published Papers (selection)

[1] C. Vicas, S. Nedevschi, "Detecting Curvilinear Features Using Structure Tensors", IEEE Transactions On Image Processing, vol. 24, no. 11, Nov 2015, pp 3874 - 3887

[2] C. Vicas, M. Lupşor, R. Badea, and S. Nedevschi, "Usefulness of Textural Analysis as a Tool for Non-Invasive Liver Fibrosis Staging," Journal of Medical Ultrasonics, vol. 38, pp. 105-117, 2011

[3] C. Vicas, M. Lupşor, M. Socaciu, S. Nedevschi, and R. Badea, "Influence of Expert-Dependent Variability over the Performance of Noninvasive Fibrosis Assessment in Patients with Chronic Hepatitis C by Means of Texture Analysis," Computational and Mathematical Methods in Medicine, vol. 2012, 2012

[4] C. Vicas, S. Nedevschi, M. Lupşor, and R. Badea, "Detection and Staging of Liver Fibrosis Using Additive Logistic Models," in Eleventh IASTED Int. Conf. Artificial Intelligence and Applications, Innsbruck, Austria, 2011, pp. 95-100.

[5] C. Vicas, S. Nedevschi, M. Lupşor, and R. Badea, "Automatic detection of liver capsule using Gabor filters. Applications in steatosis quantification," IEEE Proc.Intelligent Computer Comm. Process., pp. 133-140, Aug. 2009.

[6] C. Vicas, I. Rusu, N. A. Hajjar and M. Lupşor-Platon, "Deep convolutional neural nets for objective steatosis detection from liver samples," 2017 IEEE Proc.Intelligent Computer Comm. Process., 2017, pp. 385-390.

Failures

Failures that hurt, failures that shaped my path. Because it is never easy!

School period

- Finished 7 years of training as a physician but failed to thrive as a physician. Luckily I somehow anticipated that and stated to prep for engineering career.
- Failed to be admitted in 2001 [admitted in 2002] at Technical University Cluj Napoca, Romania
- Failed to raise above the ½ of the leaderboard at ACM International Collegiate Programming Contests. (participated in 2003 and 2004)

Computer Vision Researcher at TUCN

Medical image processing:

- Failed to make fractals understand the medical ultrasound image.
- Failed to detect a disease from images only.
- My papers got rejected from many journals, sometimes with only one sentence at the review.
- As a team, failed to find/win a grant program that would allow our team to continue in medical image processing field. Switched to another field, electronic microscopy.

Fundamental research:

- After the PhD defense, I spent 2 more years doing fundamental research. Although I published in a highly ranked journal I pushed the domain only by a small amount and gained little attention (few citations).
- The above results in fundamental image processing were rendered obsolete by the new and shiny deep learning approaches.

Software Engineer at Catalysts GmbH

- Failed to elaborate and train a purely analytical model to detect clouds. Backtracked to what others did to get a decent level of performance.
- Failed to find the right balance between clean code and rapid domain exploration and so I failed to explore more approaches to the cloud detection problem.

Freelancing, startups and other extra

- Startup: Deep learning fashion aggregator. We had clients and some revenue. Unfortunately the revenue was because we did better SEO and not because of the core business value. We decided to pull the plug after ~1.5 years.
- Startup: Quality control in clinical laboratory. Worked one summer for a solution that had afterwards zero users. The system was too complex for current, day to day needs.
- Startup: Patient management for dentistry office. No clients, even the team members didn't use it.
- NOAA Right Whale Recognition, Kaggle competition. I tried "old school" image processing but I didn't raise above 200'th place. Since then I focused more on deep learning.
- Failed to get a nice score to online class Introduction to Artificial Intelligence, Udacity
- Failed to get a C1 at spoken English. Still failing to upgrade my English skills.

Other job applications (that mattered)

- Google, 2012, 2013. Rejected after on-site interviews (twice!)
- Carl Zeiss, 2014. No interview, rejection letter
- Google, 2015, Postponed the reply to a new interview invitation