

João Carreira

Curriculum vitae

SUMMARY

Electrical Engineer, PhD, specialist in video coding, transmission and quality evaluation.

Versatile and very enthusiastic about software development and problem-solving, always seeking new challenges. During my academic journey, I always looked for new topics to learn which helped me solve day to day problems and automate and ease my research experiments.

The knowledge acquired can help me solve problems not only in regarding image and video processing but also general software development problems and systems management.

WORK EXPERIENCE

March 2019 – Present

Instituto de Telecomunicações - IT
Research assistant

ARoundVision project: investigate new coding and processing tools for UHD-360° video, aiming at developing new scalable and low complexity encoders.

Responsibilities include work with the research leader in the management of the activities of the different researchers.

March 2017 – Present

ESTG, Polytechnic Institute of Leiria
Invited Assistant Lecturer

Professor of Electronics Engineering Department.
Contents: circuits analysis, analogue and digital signal processing, embedded programming, C/C++ language.

November 2008 – February 2019

Instituto de Telecomunicações - IT
Research fellow

2013-2018: Develop techniques to improve the error resilience and error concealment of the HEVC standard.

2009-2012: P3DTV Project - Development of error concealment techniques and subjective quality evaluation of 3D video quality affected by transmission errors in video decoder's complaint with H.264/MVC.

2008-2009: Research on the state-of-the-art technologies for digital television broadcast; performance evaluation of DVB-T transmission using R&S SFE and R&S DVM400.

January 2014 – March 2014

University of Surrey
Assistant Lecturer

Lecturer on practical based course work of software and hardware development.
Contents: C language, microcontrollers programming.

October 2011 – July 2012

ESTG, Polytechnic Institute of Leiria
Laboratory Assistant

Provide support to students on the practical courses.
Contents: C language, microcontrollers programming.

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EDUCATION

January 2015 – December 2018

IDT, Loughborough University London
PhD in Electrical Engineering

Thesis title: Error resilience and error concealment for High Efficiency Video Coding

Supervisors: Ahmet Kondoç, Erhan Ekmekcioglu - IDT; Pedro Assunção, Sérgio Faria - IT.

April 2013 – December 2014

University of Surrey
PhD Student in Electrical Engineering

Supervisors: Ahmet Kondoç, Erhan Ekmekcioglu; Pedro Assunção, Sérgio Faria.

September 2010 - December 2012

ESTG, Polytechnic Institute of Leiria
MSc in Electrical Engineering - Telecommunications

Thesis title: "Subjective Quality Evaluation and Frame Loss Concealment in 3D Video".

Supervisors: Pedro Assunção, Sérgio Faria and Nuno Rodrigues.

Classification: 18 out of 20.

September 2007 - July 2010

ESTG, Polytechnic Institute of Leiria
BSc in Electrical Engineering – Electronics and Telecommunications

Final project title: "DVB-T3D - Transmission of 3D Television over a DVB-T Channel".

Supervisors: Pedro Assunção and Sérgio Faria.

Classification: 17 out of 20.

TECHNICAL SKILLS

- Research and development;
- 2D/3D and 360° image and video analysis and compression;
- Familiar with Open Source tools for image and video processing, e.g., OpenCV, FFmpeg, YOLO;
- Experience with programmable devices, e.g., Microcontrollers, ESP, Arduino and FPGA;
- Advanced experience with Linux operating system;
- Experience with software configuration management (SCM), e.g., Git.

SOFTWARE SKILLS

IDE	VSCode, Eclipse, MPLAB, Proteus;
TOOLS	OpenCV, FFmpeg, QT, shell tools (sed, awk, grep), gcc, CMake, valgrind, Doxygen, gtest;
CONTAINERS	Docker, LXC
OS	Gentoo, Debian/Ubuntu, Windows;
CODECS	VVC, HEVC and H.264/AVC;
OPEN SOURCE	KDE/Qt, GitHub, CI/CD;
OFFICE	Experienced with MS Word and Excel;

PROGRAMMING SKILLS

ADVANCED	C/C++, shell scripting, \LaTeX .
INTERMEDIATE	Python, Matlab
BEGINNER	Jinja2, HTML, VHDL, Ladder.

COMMUNICATION SKILLS

PORTUGUESE	Native speaker
ENGLISH	Oral: fair – Written: good
IELTS - International English Language Testing System: Average score of 7.0 out of 10 (2013).	

ADDITIONAL INTERESTS

- **Open Source software development:** main developer of the open source raw video player *Calyp* based on Qt with support for plugins (<https://github.com/pixlra/calyp>); Contributor on other projects on GitHub (e.g., KTikZ) and minor contributions to Gentoo OS and KDE framework;
- **Self-hosting:** home automation software (Home Assistant), communication protocols (MQTT, Zigbee) and software/hardware management (Nextcloud, reverse proxy and firewall management);
- **Embedded and IoT devices:** Raspberry PI, Arduino, ESP and Microchip;
- Helping on local non-profit organisation.

MAIN PUBLICATIONS

JOURNAL PUBLICATIONS:

- J. F. M. Carreira, P. A. Assunção, S. M. M. de Faria, E. Ekmekcioglu, and A. Kondo, "Error concealment-aware encoding for robust video transmission," *IEEE Transactions on Broadcasting*, vol. 65, no. 2, pp. 282–293, Jun. 2019
- J. Carreira, P. Assuncao, S. Faria, E. Ekmekcioglu, and A. Kondo, "A Two-stage Approach for Robust HEVC Coding and Streaming," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 28, no. 8, pp. 1960–1973, Aug. 2018.

INTERNATIONAL CONFERENCE PUBLICATIONS:

- J. Carreira, S. M. M. de Faria, L. M. N. Tavora, A. Navarro, and P. A. Assuncao, "Versatile video coding of 360° video using adaptive resolution change," in *2020 IEEE International Conference on Image Processing (ICIP)*, Oct. 2020, pp. 3398–3402.
- J. Carreira, S. M. M. de Faria, L. M. N. Tavora, A. Navarro, and P. A. A. Assuncao, "Scalable coding of 360-degree video for streaming adaptation at 5G network edges," in *IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB)*, Oct. 2020, pp. 1–5.
- J. Carreira, S. M. M. de Faria, L. M. N. Tavora, A. Navarro, and P. A. A. Assuncao, "Versatile video coding of 360-degree video using frame-based FoV and visual attention," in *IEEE International Symposium on Multimedia (ISM)*, Dec. 2019, pp. 80–805.
- J. Carreira, P. Assuncao, S. Faria, E. Ekmekcioglu, and A. Kondo, "A Robust Video Encoding Scheme to Enhance Error Concealment of Intra Frames," in *IEEE International Conference on Circuits and Systems (ISCAS)*, May 2017, pp. 1–5.
- J. Carreira, E. Ekmekcioglu, A. Kondo, P. Assuncao, S. Faria, and V. D. Silva, "Selective Motion Vector Redundancies for Improved Error Resilience in HEVC," in *IEEE International Conference on Image Processing (ICIP)*, Oct. 2014, pp. 2457–2461.
- J. Carreira, V. D. Silva, E. Ekmekcioglu, A. Kondo, P. Assuncao, and S. Faria, "Dynamic Motion Vector Refreshing for Enhanced Error Resilience in HEVC," in *22nd European Signal Processing Conference (EUSIPCO)*, Sep. 2014, pp. 281–285.

For a complete list of my publications please visit <https://jfmcarreira.pt/publications>