

Guilherme Corrêa, Ph.D.

Curriculum Vitae

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Guilherme Corrêa has been a professor at the Federal University of Pelotas (UFPel) since 2016. He holds a Ph.D. in Electrical and Computer Engineering (2015) from the University of Coimbra, Portugal, a Master's in Computer Science (2010) from the Federal University of Rio Grande do Sul (UFRGS), Brazil, and a Bachelor's in Computer Science (2008) from the Federal University of Pelotas (UFPel), Brazil. Between 2010 and 2015, he worked as a researcher at the Telecommunications Institute (IT), Portugal. Throughout 2020, he served as a visiting professor at the University of Lisbon (UL), Portugal, at the Systems and Computing Engineering Institute (INESC-ID). At UFPel, he is with the Center for Technological Development (CDTec) and teaches in the Computer Science and Computer Engineering undergraduate courses, and the Graduate Program in Computing (PPGC). He is currently the Head of the Graduate Program in Computing (2023-2025), where he also served as Deputy Coordinator from 2021 to 2023. Prof. Guilherme Corrêa is a Research Productivity Fellow of the Brazilian National Council for Scientific and Technological Development (CNPq), working in the Video Technology Research Group (ViTech). His main research topics of interest are: digital processing of visual signals, image and video coding, machine learning applied to multimedia, and digital systems design. He is the author of a book, two patents, and two software registered with the National Institute of Industrial Property (INPI), as well as over 100 articles published in journals and proceedings of indexed events in his field of expertise. He has coordinated research projects funded by public funding agencies. Prof. Guilherme Corrêa is a Senior Member of the IEEE, a member of the IEEE Signal Processing Society (SPS), and a member of the IEEE Circuits and Systems Society (CASS), where he serves as an elected member of the IEEE CASS MSA-TC (Multimedia Systems Applications Technical Committee) technical committee, for the 2021-2025 term, and as vice-coordinator of the Rio Grande do Sul Chapter of the IEEE CASS, for the 2024-2026 term. He is a member of the CE-021:000.029 Study Committee (Audio, Image, Multimedia, and Hypermedia Coding Study Committee) of the Brazilian National Standards Organization (ABNT), since its creation in 2018. He is a member of the Brazilian Microelectronics Society (SBMicro) and a member of the Brazilian Computer Society (SBC), where he has served as Institutional Representative of UFPel since 2018.



Personal Information

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Google Scholar	https://scholar.google.com/citations?user=uQ807KAAAAAJ
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Education

2010 – 2015	Ph.D. in Electrical and Computer Engineering Thesis: <i>Computational Complexity Reduction and Scaling for High Efficiency Video Encoders</i> University of Coimbra, UC, Coimbra, Portugal
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- 2009 – 2010 M.Sc. in Computer Science**
Thesis: *Study and Development of Heuristics and Hardware Architectures for Fast Block Coding Mode Decision for the H.264/AVC Standard*
Federal University of Rio Grande do Sul, UFRGS, Porto Alegre, Brazil
- 2005 - 2008 B.Sc. in Computer Science**
Thesis: *Interlayer Deblocking Filter for H.264/SVC Extension Implemented in FPGA*
Federal University of Pelotas, UFPEL, Pelotas, Brazil
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Professional Activities

1. Professor & Researcher

Federal University of Pelotas – UFPEL, Brazil

May 2016 – today

Head of the Graduate Program in Computing (2023-2025), leading a group of 26 professors and about 170 graduate students.

Computer Science/Computer Engineering Professor, teaching the following courses in both undergraduate and graduate levels: *Digital Image Processing*, *Video Coding Fundamentals*, *Computer Networks*, and *Multimedia Networks*.

Researcher with the Video Technology Research Group (ViTech), leading projects related to: video coding/transcoding (VVC, HEVC, AV1, VP9), point cloud compression, video quality enhancement, machine learning for multimedia applications, hardware design for multimedia systems.

2. Visiting Professor

University of Lisbon – UL, Portugal

Feb 2020 – Dec 2020

Visiting Professor & Researcher with the Systems and Computing Engineering Institute (INESC-ID), developing complexity reduction solutions for AV1 and VVC video codecs based on machine learning.

3. Research Assistant

Instituto de Telecomunicações – IT, Portugal

Oct 2010 – Jan 2015

Research Assistant at the Multimedia Lab, developing solutions and algorithms for low-complexity video coding (mainly HEVC).

4. Student Researcher

Federal University of Rio Grande do Sul – UFRGS, Brazil

Mar 2009 – Sep 2010

Student Researcher at the Institute of Informatics, developing hardware accelerators for video compression (mainly H.264/AVC).

Topics of Interest

- Video coding (VVC, HEVC, H.264, AV1, VP9)
- Point cloud compression
- Image/video quality enhancement
- Machine learning/deep learning for multimedia applications
- Multimedia transport and delivery
- Digital systems design for multimedia

Publications List

Book

1. Correa, G.; Assuncao, P.; Agostini, L.; Cruz, L. **Complexity-Aware High Efficiency Video Coding**. BerlSpringer International Publishing, 2016, v.1. p. 225. <https://link.springer.com/book/10.1007/978-3-319-25778-5>.

Chapters

1. De Melo, Ramásio; De Lima, Gustavo; Corrêa, Guilherme; Zatt, Bruno; De Aguiar, Marilton; Nachtigall, Gilmar; Araújo, Ricardo. **Diagnosis of Apple Fruit Diseases in the Wild with Mask R-CNN**. Ricardo Cerri, Ronaldo C. Prati. (Org.). Lecture Notes in Computer Science. -ed.: Springer International Publishing, 2020, v. 12319, p. 256-270.
2. Correa, G.; Assuncao, P.; Agostini, L.; Cruz, L. **Computational Resource Management for Video Coding in Mobile Environments** Modeling and Optimization in Science and Technologies.1 ed. Berlim: Springer International Publishing, 2014, v.3, p. 515-549.

Publications in journals

1. BORGES, ALEX; ZATT, Bruno; PORTO, MARCELO; Correa, Guilherme. **A systematic literature review on video transcoding acceleration: challenges, solutions, and trends**. MULTIMEDIA TOOLS AND APPLICATIONS (DORDRECHT. ONLINE), v. 1, p. 1, 2024.
2. PALAU, R.; PENNY, W.; VIANA, R.; GOEBEL, J.; CORREA, G.; PORTO, M.; AGOSTINI, L.. **High-Throughput Hardware Design for the AV1 Decoder Switchable Loop Restoration Filters**. JICS. JOURNAL OF INTEGRATED CIRCUITS AND SYSTEMS, v. 18, p. 1-12, 2023.
3. CORRÊA, MARCEL; PALOMINO, DANIEL; CORRÊA, Guilherme; AGOSTINI, LUCIANO. **Heuristic-based Algorithms for Low-Complexity AV1 Intra Prediction**. IEEE Design & Test, v. 40, p. 1-1, 2023.
4. GARCIA, BRUNA; SILVEIRA, BIANCA; DINIZ, CLAUDIO; PALOMINO, DANIEL; Correa, Guilherme. **Low-Power Inverse Multiple Transform Hardware Design for 8K@60fps Real-Time VVC Decoding**. JICS. JOURNAL OF INTEGRATED CIRCUITS AND SYSTEMS, v. 18, p. 1-8, 2023. Citações:1
5. BENDER, ISIS; BORGES, ALEX; AGOSTINI, LUCIANO; ZATT, Bruno; Correa, Guilherme; PORTO, Marcelo. **Complexity and compression efficiency analysis of libaom AV1 video codec**. Journal of Real-Time Image Processing, v. 20, p. 50, 2023. Citações:2
6. GONCALVES, P.; AGOSTINI, L.; CORREA, G.; PORTO, M. . **Learning-based bypass zone search algorithm for fast motion estimation**. MULTIMEDIA TOOLS AND APPLICATIONS, p. 1-26, 2022.
7. NETO, L. et al; CORREA, MARCEL; PALOMINO, DANIEL; AGOSTINI, LUCIANO; Correa, Guilherme. **Power-Quality Configurable Hardware Design for AV1 Directional Intraframe Prediction**. IEEE Design & Test, v. 39, p. 38-45, 2022.
8. BORGES, ALEX; ZATT, Bruno; PORTO, Marcelo; Correa, Guilherme. **Complexity-scalable HEVC-to-AV1 video transcoding based on partition inheritance**. Journal of Real-Time Image Processing, v. OF, p. 1-13, 2021.
9. CORREA, M.; SALDANHA, M.; BORGES, A.; CORREA, G.; PALOMINO, D.; PORTO, M.; ZATT, B.; AGOSTINI, L.. **AV1 and VVC Video Codecs: Overview on Complexity Reduction and Hardware Design**. IEEE Open Journal of Circuits and Systems, v. 2, p. 564-576, 2021.
10. PALAU, R.; SILVEIRA, B.; DOMANSKI, R.; LOOSE, M.; CERVEIRA, A.; SAMPAIO, F.; PALOMINO, D.; PORTO, M.; CORREA, G.; AGOSTINI, L.. **Modern Video Coding: Methods, Challenges and Systems**. JICS. JOURNAL OF

INTEGRATED CIRCUITS AND SYSTEMS, v. 16, p. 1-12, 2021.

11. CORREA, MARCEL MOSCARELLI; WASKOW, BIANCA HERMANN; GOEBEL, JONES WILLIAM; PALOMINO, DANIEL MUNARI; CORREA, Guilherme Ribeiro; AGOSTINI, LUCIANO VOLCAN. **A High-Throughput Hardware Architecture for AVI Non-Directional Intra Modes**. IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS, v. 67, p. 1-14, 2020.
12. BUBOLZ, THIAGO ALVES; CONCEIÇÃO, RUHAN; GRELLERT, MATEUS; ZATT, Bruno; AGOSTINI, LUCIANO; Correa, Guilherme. **Direct and Semi-Direct Frame Partitioning Mapping for Computation and Energy-Aware HEVC Transrating**. JICS. JOURNAL OF INTEGRATED CIRCUITS AND SYSTEMS, v. 15, p. 1-8, 2020.
13. PALAU, ROBERTA DE CARVALHO NOBRE; GOEBEL, JONES; PALOMINO, DANIEL; Correa, Guilherme; PORTO, Marcelo; AGOSTINI, LUCIANO. **Real-Time and Low-Power HEVC Deblocking Filter Architecture Targeting 8K UHD @ 60fps Videos**. JICS. JOURNAL OF INTEGRATED CIRCUITS AND SYSTEMS, v. 15, p. 1-9, 2020.
14. SALDANHA, MÁRIO; CONCEIÇÃO, RUHAN; AFONSO, VLADIMIR; AVILA, Giovanni; SUSIN, Altamiro; PORTO, Marcelo; ZATT, Bruno; Correa, Guilherme; AGOSTINI, LUCIANO. **Complexity and compression efficiency assessment of 3D-HEVC encoder**. MULTIMEDIA TOOLS AND APPLICATIONS, v. P, p. 1-22, 2020.
15. STORCH, IAGO; CORRÊA, Guilherme; ZATT, Bruno; PALOMINO, D. M.; AGOSTINI, LUCIANO. **Memory-aware Workload Balancing Technique based on Decision Trees for Parallel HEVC Video Coding**. JICS. JOURNAL OF INTEGRATED CIRCUITS AND SYSTEMS, v. 15, p. 1-9, 2020.
16. BUBOLZ, THIAGO LUIZ ALVES; CONCEICAO, RUHAN A.; GRELLERT, MATEUS; AGOSTINI, LUCIANO; ZATT, Bruno; Correa, Guilherme. **Quality and Energy-Aware HEVC Transrating Based on Machine Learning**. IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS, v. 99, p. 1-13, 2019.
17. AFONSO, VLADIMIR; CONCEICAO, RUHAN; SALDANHA, MARIO; BRAATZ, LUCIANO; PERLEBERG, MURILO; CORRÊA, Guilherme; PORTO, Marcelo; AGOSTINI, L. V.; ZATT, Bruno; SUSIN, Altamiro. **Energy-Aware Motion and Disparity Estimation System for 3D-HEVC With Run-Time Adaptive Memory Hierarchy**. IEEE Transactions on Circuits and Systems for Video Technology, v. 29, p. 1878-1892, 2019.
18. GONCALVES, P. H.; MORAES, CANDIDO; PORTO, MARCELO; CORRÊA, Guilherme. **Complexity-Aware TZS Algorithm for Mobile Video Encoders**. JICS. JOURNAL OF INTEGRATED CIRCUITS AND SYSTEMS, v. 14, p. 1-9, 2019.
19. Correa, Guilherme; ASSUNCAO, PEDRO; AGOSTINI, LUCIANO; DA SILVA CRUZ, LUIS A.. **Fast coding tree structure decision for HEVC based on classification trees**. Analog Integrated Circuits and Signal Processing, v. 87, p. 129-139, 2016.
20. CORRÊA, Guilherme; ASSUNCAO, PEDRO; AGOSTINI, L. V.; DA SILVA CRUZ, LUIS A.. **Complexity scalability for real-time HEVC encoders**. Journal of Real-Time Image Processing, v. 12, p. 107-122, 2016.
21. CORRÊA, Guilherme; ASSUNCAO, PEDRO A.; AGOSTINI, L. V.; DA SILVA CRUZ, LUIS A.. **Pareto-Based Method for High Efficiency Video Coding With Limited Encoding Time**. IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY, v. 26, p. 1734-1745, 2016.
22. MONTEIRO, E.; CORREA, G.; BAMPI, S.; CRUZ, L. A. S.. **From HD to UHD video: implications for embedded systems implementations of software-based HEVC video encoders**. IEEE COMSOC MMTC Communications - Frontiers, v. 11, p. 61-66, 2016.
23. CORRÊA, Guilherme; ASSUNCAO, PEDRO A.; AGOSTINI, L. V.; DA SILVA CRUZ, LUIS A.. **Fast HEVC Encoding Decisions Using Data Mining**. IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY, v. 25, p. 660-673, 2015.
24. CORRÊA, Guilherme; PALOMINO, D. M.; DINIZ, C. M.; BAMPI, Sergio; AGOSTINI, L. V.. **Low-Complexity Hierarchical Mode Decision Algorithms Targeting VLSI Architecture Design for the H.264/AVC Video Encoder**. VLSI Design, v. 2012, p. 1-20, 2012.
25. CORRÊA, Guilherme; AGOSTINI, L. V.; CRUZ, Luís A.. **Sample-Level Filtering Order for High-Throughput and Memory-Aware H.264 Deblocking Filter**. ISRN Signal Processing, v. 2012, p. 1-6, 2012.
26. PALOMINO, D. M.; CORRÊA, Guilherme; DINIZ, C. M.; BAMPI, Sergio; AGOSTINI, L. V.; SUSIN, Altamiro. **Algorithm and Hardware Design of a Fast Intra Frame Mode Decision Module for H.264/AVC Encoders**. International Journal of Reconfigurable Computing (Print), v. 2012, p. 1-10, 2012.
27. CORREA, Guilherme; ASSUNCAO, PEDRO; AGOSTINI, LUCIANO; DA SILVA CRUZ, LUIS A.. **Performance and Computational Complexity Assessment of High-Efficiency Video Encoders**. IEEE Transactions on Circuits and Systems for Video Technology (Print), v. 22, p. 1899-1909, 2012.
28. CORRÊA, Guilherme; ASSUNCAO, P. A.; AGOSTINI, L. V.; CRUZ, Luís A.. **Complexity Control of High Efficiency Video Encoders for Power-Constrained Devices**. IEEE Transactions on Consumer Electronics, v. 57, p. 1866-1874, 2011.

Publications in conferences

1. VIANA, R.; SAGRILO, F.; FERREIRA, R.; LOOSE, M.; PORTO, M.; CORREA, G.; AGOSTINI, L.. **A Hardware-Friendly Fast VVC Test Zone Search Algorithm Using Machine Learning**. 2024 IEEE 15th Latin America Symposium on

- Circuits and Systems (LASCAS), 2024, Punta del Este.
2. KREISLER, G.; SILVEIRA JUNIOR, G.; ZATT, B.; PALOMINO, D.; CORREA, G.. **Multi-Codec Video Quality Enhancement Model Based on Spatio-Temporal Deformable Fusion**. 2024 IEEE 15th Latin America Symposium on Circuits and Systems (LASCAS), 2024, Punta del Este.
 3. SANTOS, C.; TAVARES, L.; COSTA, E.; REHBEIN, G.; CORREA, G.; PORTO, M.. **Coding Efficiency and Complexity Analysis of the Geometry-based Point Cloud Encoder**. 2024 IEEE 15th Latin America Symposium on Circuits and Systems (LASCAS), 2024, Punta del Este.
 4. LODI, E.; SCARPATTO, A.; SEIDEL, I.; CORREA, G.; GRELLERT, M.. **Rate-Distortion and Complexity Analysis of Fast Video Encoders**. 2024 IEEE 15th Latin America Symposium on Circuits and Systems (LASCAS), 2024, Punta del Este.
 5. GARCIA, BRUNA; SILVEIRA, BIANCA; DINIZ, CLAUDIO; PALOMINO, DANIEL; Correa, Guilherme. **Multi-Size Inverse DCT-II Hardware Design for the VVC Decoder**. 2023 IEEE 14th Latin America Symposium on Circuits and Systems (LASCAS), 2023, Quito.
 6. SOARES, RENIRA; ISQUIERDO, MATHEUS; SAMPAIO, Felipe; RAHMANI, AMIR; DUTT, NIKIL; Correa, Guilherme; PALOMINO, DANIEL; ZATT, Bruno. **Error Resilience Evaluation of Approximate Storage in the Motion Compensation of VVC Decoders**. 2023 IEEE 14th Latin America Symposium on Circuits and Systems (LASCAS), 2023, Quito.
 7. SAGRILLO, FERNANDO; LOOSE, MARTA; VIANA, RAMIRO; SANCHEZ, GUSTAVO; CORRÊA, Guilherme; AGOSTINI, LUCIANO. **Learning-Based Fast VVC Affine Motion Estimation**. 2023 IEEE International Symposium on Circuits and Systems (ISCAS), 2023, Monterey.
 8. FREITAS, DAIANE; GRELLERT, MATEUS; DINIZ, CLÁUDIO M.; Correa, Guilherme. **Multiversion Low-Power Hardware Accelerator for the AV1 Interpolation Filters**. 2023 IEEE International Symposium on Circuits and Systems (ISCAS), 2023, Monterey.
 9. BORGES, ALEX; PORTO, Marcelo; ZATT, Bruno; Correa, Guilherme. **H.264-to-AV1 Video Transcoding Acceleration Based on Lightweight Machine Learning**. 2023 IEEE International Symposium on Circuits and Systems (ISCAS), 2023, Monterey.
 10. DUARTE, ADSON; ZATT, Bruno; Correa, Guilherme; PALOMINO, DANIEL. **Fast Intra Mode Decision Using Machine Learning for the Versatile Video Coding Standard**. 2023 IEEE International Symposium on Circuits and Systems (ISCAS), 2023, Monterey.
 11. KREISLER, GILBERTO; SILVEIRA JUNIOR, GARIBALDI DA; ZATT, Bruno; PALOMINO, DANIEL; Correa, Guilherme. **Modelo Multi-Codec Baseado em Spatio-Temporal Deformable Fusion para Melhoria de Qualidade de Vídeos Comprimidos**. Seminário Integrado de Software e Hardware, 2023, Brasil.
 12. SILVEIRA, BIANCA; PALOMINO, DANIEL; DINIZ, CLÁUDIO; Correa, Guilherme. **A Hardware Design for the Multi-Transform Module of the Versatile Video Coding Standard**. 2023 36th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2023, Rio de Janeiro.
 13. MUÑOZ, MARCELLO M.; MAASS, DENIS; PERLEBERG, MURILO; AGOSTINI, LUCIANO; Correa, Guilherme; PORTO, Marcelo. **4K UHD@60fps Design For The VVC Affine Motion Estimation Reconstructor**. 2023 36th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2023, Rio de Janeiro.
 14. MANGRICH, FILLIPI; FIRTA FOES, JOÃO GABRIEL; Correa, Guilherme; SEIDEL, ISMAEL; GRELLERT, MATEUS. **Energy and Computing Assessment of Video Processing Kernels on CPU and FPGA platforms**. 2023 36th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2023, Rio de Janeiro.
 15. DUARTE, ADSON; OLIVEIRA, ANNA; ZATT, Bruno; Correa, Guilherme; PALOMINO, DANIEL. **A Machine Learning-Based Solution to Accelerate the Intra Mode Decision for the VVC Standard**. WebMedia '23: Brazilian Symposium on Multimedia and the Web, 2023, Ribeirão Preto Brazil.
 16. CAMARGO, CAROLINE; BORGES, ALEX; ZATT, Bruno; PORTO, MARCELO; Correa, Guilherme. **Using Decision Trees to Accelerate the H.266/VVC-to-AV1 Video Transcoding**. 2023 36th SIBGRAPI Conference on Graphics, Patterns and Images (SIBGRAPI), 2023, Rio Grande.
 17. SIQUEIRA, ÍCARO; CORRÊA, Guilherme; GRELLERT, MATEUS. **Complexity and Coding Efficiency Assessment of AOMedia Video 1**. 2023 IEEE 14th Latin America Symposium on Circuits and Systems (LASCAS), 2023, Quito.
 18. SILVEIRA, BIANCA; NETO, LUIS; PALOMINO, DANIEL ; DINIZ, CLAUDIO ; Correa, Guilherme . **Multiple Transform Selection Hardware Design for 4K@60fps Real-Time Versatile Video Coding**. 2022 IEEE International Symposium on Circuits and Systems (ISCAS), 2022, Austin.
 19. DUARTE, ADSON; GONCALVES, PAULO ; AGOSTINI, LUCIANO ; ZATT, Bruno ; Correa, Guilherme ; PORTO, MARCELO ; PALOMINO, DANIEL . **Fast Affine Motion Estimation for VVC using Machine-Learning-Based Early Search Termination**. 2022 IEEE International Symposium on Circuits and Systems (ISCAS), 2022, Austin.
 20. CORREA, MARCEL ; ROMA, NUNO; PALOMINO, DANIEL ; Correa, Guilherme ; AGOSTINI, LUCIANO . **Mode-Adaptive Subsampling of SAD/SSE Operations for Intra Prediction Cost Reduction**. 2022 IEEE International Symposium on Circuits and Systems (ISCAS), 2022, Austin.
 21. FREITAS, DAIANE; NAGAI, BRUNA; GRELLERT, MATEUS ; DINIZ, CLAUDIO M.; Correa, Guilherme . **High-Throughput Multifilter VLSI Design for the AV1 Fractional Motion Estimation**. 2022 35th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2022, Porto Alegre.

22. PALAU, ROBERTA; GOEBEL, JONES; ZUMMACH, EDUARDO; VIANA, RAMIRO; CORREA, MARCEL; Correa, Guilherme; PORTO, MARCELO; AGOSTINI, LUCIANO . **An UHD 4K@60fps Dual Self-Guided Filter Targeting the AV1 Decoder**. 2022 35th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2022, Porto Alegre.
23. CORREA, MARCEL; PALOMINO, DANIEL; Correa, Guilherme; AGOSTINI, LUCIANO . **Direction-Based Fast Mode Decision and Hardware Design for the AV1 Intra Prediction**. 2022 35th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2022, Porto Alegre.
24. LINDINO, M.; ZATT, B.; GRELLERT, M.; CORREA, G. . **Low-Complexity Multi-Type Tree Partitioning for Versatile Video Coding Based on Machine Learning**. 29th IEEE International Conference on Image Processing (IEEE ICIP), 2022, Bordeaux.
25. DOS SANTOS BASTOS, NARÚSCI; RIBEIRO DOS SANTOS IKENOUE, LUCAS SEIDY; PALOMINO, DANIEL; CORRÊA, Guilherme; TAVARES, TATIANA; ZATT, Bruno . **Full Reference Stereoscopic Objective Quality Assessment using Lightweight Machine Learning**. WebMedia '22: Brazilian Symposium on Multimedia and Web, 2022, Curitiba Brazil.
26. LOOSE, M.; VIANA, R.; SAGRILO, F.; SANCHEZ, G.; CORREA, G.; AGOSTINI, L. . **A Hardware-Friendly and Configurable Heuristic Targeting VVC Inter-Frame Prediction**. 2022 29th IEEE International Conference on Electronics, Circuits & Systems, 2022, Glasgow.
27. REHBEIN, G.; BENDER, I.; CORREA, G.; AGOSTINI, L.; PORTO, M. . **Multi-Objective Optimized Complexity Control for the AV1 Video Encoder**. 36th Picture Coding Symposium (PCS), 2022, San Jose.
28. PALAU, ROBERTA; PENNY, WAGNER; GOEBEL, JONES; ZUMMACH, EDUARDO; Correa, Guilherme; PORTO, MARCELO; AGOSTINI, LUCIANO . **Hardware Design for the Separable Symmetric Normalized Wiener Filter of the AV1 Decoder**. 2022 35th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2022, Porto Alegre.
29. Correa, Guilherme; DALL'OGGIO, PARGLES; PALOMINO, DANIEL; AGOSTINI, LUCIANO . **Fast Block Size Decision for HEVC Encoders with On-the-Fly Trained Classifiers**. 2020 28th European Signal Processing Conference (EUSIPCO), 2021, Amsterdam.
30. LINDINO, MATHEUS; BUBOLZ, Thiago; ZATT, Bruno; PALOMINO, DANIEL; Correa, Guilherme . **Low-Complexity HEVC Transrating Based on Prediction Unit Mode Inheritance**. 2020 28th European Signal Processing Conference (EUSIPCO), 2021, Amsterdam.
31. BORGES, ALEX; PALOMINO, DANIEL; ZATT, Bruno; PORTO, Marcelo; Correa, Guilherme . **Fast VP9-to-AV1 Transcoding based on Block Partitioning Inheritance**. 2020 28th European Signal Processing Conference (EUSIPCO), 2021, Amsterdam.
32. STORCH, Iago; Correa, Guilherme; ZATT, Bruno; AGOSTINI, LUCIANO; PALOMINO, DANIEL . **ESA360 - Early SKIP Mode Decision Algorithm for Fast ERP 360 Video Coding**. 2020 28th European Signal Processing Conference (EUSIPCO), 2021, Amsterdam.
33. DOMANSKI, ROBSON; KOLODZIEJSKI, WILLIAM; Correa, Guilherme; PORTO, Marcelo; ZATT, Bruno; AGOSTINI, LUCIANO . **Low-Power and High-Throughput Approximated Architecture for AV1 FME Interpolation**. 2021 IEEE International Symposium on Circuits and Systems (ISCAS), 2021, Daegu.
34. SIQUEIRA, ICARO; Correa, Guilherme; GRELLERT, MATEUS . **Complexity and Coding Efficiency Assessment of the Versatile Video Coding Standard**. 2021 IEEE International Symposium on Circuits and Systems (ISCAS), 2021, Daegu.
35. NETO, LUIZ; CORREA, MARCEL; PALOMINO, DANIEL; AGOSTINI, LUCIANO; Correa, Guilherme . **Exploring Operation Sharing in Directional Intra Frame Prediction of AV1 Video Coding**. 2021 IEEE 12th Latin America Symposium on Circuits and System (LASCAS), 2021, Arequipa.
36. SANTOS, CRISTIANO; GONCALVES, MATEUS; Correa, Guilherme; PORTO, Marcelo . **Block-Based Inter-Frame Prediction For Dynamic Point Cloud Compression**. 2021 IEEE International Conference on Image Processing (ICIP), 2021, Anchorage.
37. FREITAS, DAIANE; DINIZ, CLAUDIO M.; GRELLERT, MATEUS; Correa, Guilherme . **High-Throughput Sharp Interpolation Filter Hardware Architecture for the AV1 Video Codec**. 2021 34th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2021, Campinas.
38. NETO, LUIZ; CORREA, MARCEL; DANIEL PALOMINO, BRUNO ZATT; AGOSTINI, LUCIANO; Correa, Guilherme . **Configurable Power/Quality-Aware Hardware Design for the AV1 Directional Intra Frame Prediction**. 2021 34th SBC/SBMicro/IEEE/ACM Symposium on Integrated Circuits and Systems Design (SBCCI), 2021, Campinas.
39. SIQUEIRA, ICARO; Correa, Guilherme; GRELLERT, MATEUS . **Rate-Distortion and Complexity Comparison of HEVC and VVC Video Encoders**. 2020 IEEE 11th Latin American Symposium on Circuits & Systems (LASCAS), 2020, San Jose.
40. STORCH, Iago; ZATT, Bruno; AGOSTINI, LUCIANO; Correa, Guilherme; DA SILVA CRUZ, LUIS A.; PALOMINO, DANIEL . **Spatially Adaptive Intra Mode Pre-Selection for ERP 360 Video Coding**. ICASSP 2020 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2020, Barcelona.
41. MACHADO, ITALO D.; DE AGUIAR, MARILTON S.; PORTO, Marcelo; Correa, Guilherme; PALOMINO, DANIEL; ZATT, Bruno . **RDE-MOGA: Automatic Selection of Rate-Distortion-Energy Control Points for Video**

- Encoders Using Multi-Objective Genetic Algorithm.** ICASSP 2020 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2020, Barcelona.
42. PENNY, WAGNER; Correa, Guilherme ; AGOSTINI, LUCIANO ; PALOMINO, DANIEL ; PORTO, Marcelo ; NAZAR, GABRIEL; ZATT, Bruno . **Low-Power and Memory-Aware Approximate Hardware Architecture for Fractional Motion Estimation Interpolation on HEVC.** 2020 IEEE International Symposium on Circuits and Systems (ISCAS), 2020, Sevilla.
 43. CORREA, MARCEL ; NETO, LUIZ; PALOMINO, DANIEL ; Correa, Guilherme ; AGOSTINI, LUCIANO . **ASIC Solution for the Directional Intra Prediction of the AV1 Encoder Targeting UHD 4K Videos.** 2020 IEEE International Symposium on Circuits and Systems (ISCAS), 2020, Sevilla.
 44. NETO, LUIZ; CORREA, MARCEL ; PALOMINO, DANIEL ; AGOSTINI, LUCIANO ; Correa, Guilherme . **Directional Intra Frame Prediction Architecture with Edge Filter and Upsampling for AV1 Video Coding.** 2020 33rd Symposium on Integrated Circuits and Systems Design (SBCCI), 2020, Campinas.
 45. JAHNKE, MATHEUS; GOEBEL, JONES; PALOMINO, DANIEL ; Correa, Guilherme ; AGOSTINI, LUCIANO ; PORTO, Marcelo ; ZATT, Bruno . **4D-DCT Hardware Architecture for JPEG Pleno Light Field Coding.** 2020 IEEE International Conference on Visual Communications and Image Processing (VCIP), 2020, Macau.
 46. SALDANHA, MARIO ; CORREA, MARCEL ; Correa, Guilherme ; PALOMINO, DANIEL ; PORTO, Marcelo ; ZATT, Bruno ; AGOSTINI, LUCIANO . **An Overview of Dedicated Hardware Designs for State-of-the-Art AV1 and H.266/VVC Video Codecs.** 2020 27th IEEE International Conference on Electronics, Circuits and Systems (ICECS), 2020, Glasgow.
 47. ZUMMACH, EDUARDO; PALAU, ROBERTA; GOEBEL, JONES; SAMPAIO, Felipe; Correa, Guilherme; AGOSTINI, LUCIANO; PORTO, Marcelo . **An UHD 4K@60fps Deblocking Filter Hardware Targeting the AV1 Decoder.** 2020 27th IEEE International Conference on Electronics, Circuits and Systems (ICECS), 2020, Glasgow.
 48. BUBOLZ, Thiago ; GRELLERT, MATEUS ; ZATT, Bruno ; Correa, Guilherme . **Coding Tree Early Termination for Fast HEVC Transrating Based on Random Forests.** ICASSP 2019 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2019, Brighton.
 49. CORREA, MARCEL ; WASKOW, BIANCA ; GOEBEL, JONES; PALOMINO, DANIEL ; Correa, Guilherme ; AGOSTINI, LUCIANO . **A High Throughput Hardware Architecture Targeting the AV1 Paeth Intra Predictor.** 2019 IEEE 10th Latin American Symposium on Circuits & Systems (LASCAS), 2019, Armenia.
 50. CORREA, MARCEL ; WASKOW, BIANCA ; ZATT, Bruno ; PALOMINO, DANIEL ; Correa, Guilherme ; AGOSTINI, LUCIANO . **High Throughput Hardware Design for AV1 Paeth and Smooth Intra Modes.** 2019 IEEE International Symposium on Circuits and Systems (ISCAS), 2019, Sapporo.
 51. Correa, Guilherme; DALLOGLIO, PARGLES; PALOMINO, DANIEL ; AGOSTINI, LUCIANO . **Online Machine Learning for Fast Coding Unit Decisions in HEVC.** 2019 Data Compression Conference (DCC), 2019, Snowbird.
 52. BORGES, ALEX ; ZATT, Bruno ; PORTO, MARCELO ; Correa, Guilherme . **Fast Hevc-to-Av1 Transcoding Based On Coding Unit Depth Inheritance.** 2019 IEEE International Conference on Image Processing (ICIP), 2019, Taipei.
 53. GONCALVES, MATEUS ; AGOSTINI, LUCIANO ; PALOMINO, DANIEL ; PORTO, MARCELO ; Correa, Guilherme . **Encoding Efficiency and Computational Cost Assessment of State-Of-The-Art Point Cloud Codecs.** 2019 IEEE International Conference on Image Processing (ICIP), 2019, Taipei.
 54. CORREA, MARCEL ; ZATT, Bruno ; PALOMINO, DANIEL ; Correa, Guilherme ; AGOSTINI, LUCIANO . **A Fast Local Mode Decision for the HEVC Intra Prediction Based on Direction Detection.** 2019 27th European Signal Processing Conference (EUSIPCO), 2019, A Coruna.
 55. BENDER, ISIS; PALOMINO, DANIEL ; AGOSTINI, LUCIANO ; Correa, Guilherme ; PORTO, MARCELO . **Compression Efficiency and Computational Cost Comparison between AV1 and HEVC Encoders.** 2019 27th European Signal Processing Conference (EUSIPCO), 2019, A Coruna.
 56. BORGES, ALEX ; ZATT, Bruno ; PORTO, MARCELO ; AGOSTINI, LUCIANO ; Correa, Guilherme . **Complexity Scalable HEVC-to-AV1 Transcoding Based on Coding Tree Depth Inheritance.** 2019 27th European Signal Processing Conference (EUSIPCO), 2019, A Coruna.
 57. SOARES, YAN; CORRÊA, Guilherme ; AGOSTINI, LUCIANO . **Fast partitioning decision making for prediction units on H.264-to-HEVC transcoding using machine learning.** the 25th Brazillian Symposium, 2019, Rio de Janeiro.
 58. BUBOLZ, Thiago ; ZATT, Bruno ; Correa, Guilherme ; GRELLERT, MATEUS . **Evaluation of machine learning algorithms for fast video transcoding in streaming services.** the 25th Brazillian Symposium, 2019, Rio de Janeiro.
 59. AFONSO, VLADIMIR ; SUSIN, Altamiro ; PERLEBERG, MURILO; CONCEICAO, Ruhan ; Correa, Guilherme ; AGOSTINI, LUCIANO ; ZATT, Bruno ; PORTO, MARCELO . **Hardware-Friendly Unidirectional Disparity-Search Algorithm for 3D-HEVC.** 2018 IEEE International Symposium on Circuits and Systems (ISCAS), 2018, Florence.
 60. CORREA, Douglas; Correa, Guilherme ; PALOMINO, DANIEL ; ZATT, Bruno . **OTED: Encoding Optimization Technique Targeting Energy-Efficient HEVC Decoding.** 2018 IEEE International Symposium on Circuits and Systems (ISCAS), 2018, Florence.
 61. BUBOLZ, Thiago ; CONCEICAO, Ruhan ; GRELLERT, MATEUS ; ZATT, Bruno ; AGOSTINI, LUCIANO ; Correa, Guilherme . **Fast and energy-efficient HEVC transrating based on frame partitioning inheritance.** 2018 IEEE 9th

- Latin American Symposium on Circuits & Systems (LASCAS), 2018, Puerto Vallarta.
62. GRELLERT, MATEUS; BAMPI, Sergio; Correa, Guilherme; ZATT, Bruno; DA SILVA CRUZ, LUIS A. . **Learning-Based Complexity Reduction and Scaling for HEVC Encoders**. ICASSP 2018 2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018, Calgary.
 63. GONCALVES, PAULO; PORTO, MARCELO; ZATT, Bruno; AGOSTINI, LUCIANO; Correa, Guilherme . **Octagonal-Axis Raster Pattern for Improved Test Zone Search Motion Estimation**. ICASSP 2018 2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018, Calgary.
 64. PALAU, R. ; GOEBEL, J.; CORREA, G. ; PORTO, M. ; AGOSTINI, L. . **A Low-Power 8K@60fps HEVC Deblocking Filter Architecture**. 8th Workshop on Circuits and Systems Design (WCAS), 2018, Bento Gonçalves.
 65. STORCH, Iago ; ZATT, Bruno ; AGOSTINI, LUCIANO ; Correa, Guilherme ; PALOMINO, DANIEL . **Memory-Aware Tiles Workload Balance through Machine-Learnt Complexity Reduction for HEVC**. 2018 25th IEEE International Conference on Electronics, Circuits and Systems (ICECS), 2018, Bordeaux.
 66. BORGES, ALEX ; BRAATZ, LUCIANO ; ZATT, Bruno ; PORTO, MARCELO ; CORRÊA, Guilherme . **Segmented spline hardware design for high dynamic range video pre-processor**. the 30th Symposium, 2017, Fortaleza.
 67. GONCALVES, PAULO ; Correa, Guilherme ; PORTO, MARCELO ; ZATT, Bruno ; AGOSTINI, LUCIANO . **Multiple early-termination scheme for TZ search algorithm based on data mining and decision trees**. 2017 IEEE 19th International Workshop on Multimedia Signal Processing (MMSP), 2017, Luton.
 68. SANTOS, CRISTIANO; CONCEIÇÃO, RUHAN; AGOSTINI, LUCIANO; CORRÊA, Guilherme; ZATT, Bruno; PORTO, MARCELO . **Rate and Complexity-Aware Coding Scheme for Fixed-Camera Videos Based on Region-of-Interest Detection**. the 23rd Brazilian Symposium on Multimedia Systems and Web, 2017, Gramado.
 69. BUBOLZ, Thiago ; CONCEIÇÃO, RUHAN ; ALMEIDA, HEITOR; MOREIRA, ÉRICK; ZATT, Bruno ; TAVARES, TATIANA; PORTO, MARCELO ; CORRÊA, Guilherme . **Video Quality Assessment of Early SKIP/DIS for 3D-HEVC Complexity Reduction**. the 23rd Brazilian Symposium on Multimedia Systems and Web, 2017, Gramado.
 70. MELO, MATEUS; GOEBEL, JONES; FARIAS, DANIEL; SANTOS, CRISTIANO; TAVARES, TATIANA; CORRÊA, Guilherme; ZATT, Bruno; PORTO, MARCELO . **Objective and Subjective Video Quality Assessment in Mobile Devices for Low-Complexity H.264/AVC Codecs**. the 23rd Brazilian Symposium on Multimedia Systems and Web, 2017, Gramado.
 71. AVILA, Giovanni; CONCEICAO, Ruhan; BUBOLZ, Thiago; ZATT, Bruno; PORTO, MARCELO; AGOSTINI, LUCIANO; Correa, Guilherme . **Complexity reduction of 3D-HEVC based on depth analysis for background and ROI classification**. 2017 25th European Signal Processing Conference (EUSIPCO), 2017, Kos.
 72. CONCEICAO, Ruhan; AVILA, Giovanni; Correa, Guilherme; PORTO, MARCELO; ZATT, Bruno; AGOSTINI, LUCIANO . **Rate-distortion-complexity analysis for prediction unit modes in 3D-HEVC depth coding**. 2016 IEEE 7th Latin American Symposium on Circuits & Systems (LASCAS), 2016, Florianopolis.
 73. CONCEICAO, Ruhan; AVILA, Giovanni; Correa, Guilherme; PORTO, MARCELO; ZATT, Bruno; AGOSTINI, LUCIANO . **Complexity reduction for 3D-HEVC depth map coding based on early Skip and early DIS scheme**. 2016 IEEE International Conference on Image Processing (ICIP), 2016, Phoenix.
 74. Correa, Guilherme; AGOSTINI, LUCIANO ; DA SILVA CRUZ, LUIS A. . **Fast H.264/AVC to HEVC transcoder based on data mining and decision trees**. 2016 IEEE International Symposium on Circuits and Systems (ISCAS), 2016, Montréal.
 75. Correa, Guilherme; ASSUNCAO, PEDRO ; DA SILVA CRUZ, LUIS A. ; AGOSTINI, LUCIANO . **Encoding time control system for HEVC based on Rate-Distortion-Complexity analysis**. 2015 IEEE International Symposium on Circuits and Systems (ISCAS), 2015, Lisbon.
 76. CORREA, Guilherme; ASSUNCAO, PEDRO ; AGOSTINI, LUCIANO ; CRUZ, LUIS A. . **A Method for Early-Splitting of HEVC Inter Blocks Based on Decision Trees**. 22nd European Signal Processing Conference, 2014, Lisboa.
 77. Correa, Guilherme; ASSUNCAO, PEDRO ; DA SILVA CRUZ, LUIS A. ; AGOSTINI, LUCIANO . **Classification-based early termination for coding tree structure decision in HEVC**. 2014 21st IEEE International Conference on Electronics, Circuits and Systems (ICECS), 2014, Marseille.
 78. Correa, Guilherme; ASSUNCAO, PEDRO ; AGOSTINI, LUCIANO ; DA SILVA CRUZ, LUIS A. . **Four-step algorithm for early termination in HEVC inter-frame prediction based on decision trees**. 2014 Visual Communications and Image Processing (VCIP), 2014, Valletta.
 79. CORREA, Guilherme; ASSUNCAO, PEDRO ; AGOSTINI, LUCIANO ; CRUZ, LUIS A. DA SILVA . **Coding Tree Depth Estimation for Complexity Reduction of HEVC**. 2013 Data Compression Conference (DCC), 2013, Snowbird.
 80. CORREA, Guilherme; ASSUNCAO, PEDRO ; AGOSTINI, LUCIANO ; DA SILVA CRUZ, LUIS A. . **Complexity control of HEVC through quadtree depth estimation**. IEEE EUROCON 2013, 2013, Zagreb.
 81. CORREA, Guilherme; ASSUNCAO, PEDRO ; DA SILVA CRUZ, LUIS A. ; AGOSTINI, LUCIANO . **Constrained encoding structures for computational complexity scalability in HEVC**. 2013 Picture Coding Symposium (PCS), 2013, San Jose.
 82. CORREA, Guilherme; ASSUNCAO, PEDRO ; DA SILVA CRUZ, LUIS A. ; AGOSTINI, LUCIANO . **Computational complexity control for HEVC based on coding tree spatio-temporal correlation**. 2013 IEEE 20th International Conference on Electronics, Circuits, and Systems (ICECS), 2013, Abu Dhabi.
 83. CORRÊA, Guilherme; ASSUNCAO, P. A. ; AGOSTINI, L. V. ; CRUZ, Luís A. . **Adaptive Coding Tree for Complexity**

Control of High Efficiency Video Encoders. Picture Coding Symposium 2012, 2012, Cracóvia.

84. CORREA, Guilherme; ASSUNCAO, PEDRO; AGOSTINI, LUCIANO; DA SILVA CRUZ, LUIS A.. **Motion compensated tree depth limitation for complexity control of HEVC encoding.** 2012 19th IEEE International Conference on Image Processing (ICIP 2012), 2012, Orlando.
85. CORREA, Guilherme; ASSUNCAO, PEDRO; DA SILVA CRUZ, LUIS A.; AGOSTINI, LUCIANO. **Dynamic tree-depth adjustment for low power HEVC encoders.** 2012 19th IEEE International Conference on Electronics, Circuits and Systems (ICECS 2012), 2012, Seville.
86. PALOMINO, D. M.; CORRÊA, Guilherme; DINIZ, C. M.; BAMPI, Sergio; AGOSTINI, L. V.; SUSIN, Altamiro. **Algorithm and Hardware Design of a Fast Intra-Frame Mode Decision Module for H.264/AVC Encoders.** 24^o Simpósio Brasileiro de Concepção de Circuitos Integrados (SBCCI), 2011, João Pessoa.
87. CORRÊA, Guilherme; PALOMINO, D. M.; DINIZ, C. M.; AGOSTINI, L. V.; BAMPI, Sergio. **SHBS: A Heuristic for Fast Inter Mode Decision of H.264/AVC Standard Targeting VLSI Design.** 12th IEEE International Conference on Multimedia and Expo, ICME 2011, 2011, Barcelona.
88. DINIZ, CLAUDIO; Correa, Guilherme; SUSIN, Altamiro; BAMPI, Sergio. **Comparative analysis of parallel SAD calculation hardware architectures for H.264/AVC video coding.** 2010 First IEEE Latin American Symposium on Circuits and Systems (LASCAS), 2010, Foz do Iguacu.
89. POSSER, Gracieli; Correa, Guilherme; REIS, RICARDO; CARRO, Luigi; BAMPI, Sergio. **A MIPS-based ASIP to accelerate the inverse Hadamard transform for H.264/AVC video coding.** 2010 First IEEE Latin American Symposium on Circuits and Systems (LASCAS), 2010, Foz do Iguacu.
90. CORRÊA, Guilherme; PALOMINO, D. M.; DINIZ, C. M.; PORTO, Roger E. C.; AGOSTINI, L. V.. **Homogeneity and Distortion-Based Intra Mode Decision Architecture for H.264/AVC.** IEEE International Conference on Electronics, Circuits and Systems, ICECS 2010, 2010, Atenas.

Registered Patents

1. CORREA, G. et al. **CONJUNTO DE ALGORITMOS DE BAIXA COMPLEXIDADE PARA PARTICIONAMENTO DE CODING UNITS NA CODIFICAÇÃO DE VÍDEOS DIGITAIS SEGUNDO O PADRÃO H.265/HEVC (LOW-COMPLEXITY ALGORITHM SET FOR PARTITIONING CODING UNITS IN DIGITAL VIDEO ENCODING ACCORDING TO THE H.265/HEVC STANDARD).** 2017, Brazil. Register number: BR1020170189570, Brazilian National Institute of Industrial Property (INPI). Deposit: 04/09/2017.
2. CORREA, G. et al.. **MÉTODO RÁPIDO PARA ESTIMAÇÃO DE MOVIMENTO EM VÍDEO DIGITAL UTILIZANDO ÁRVORES DE DECISÃO (FAST METHOD FOR MOTION ESTIMATION IN DIGITAL VIDEO USING DECISION TREES).** 2020, Brazil. Register number: BR1020200150910, Brazilian National Institute of Industrial Property (INPI). Deposit: 24/07/2020.

Registered Software

1. CONCEICAO, Ruhan; CORREA, Guilherme; PORTO, MARCELO; ZATT, Bruno; AGOSTINI, LUCIANO. **HEVC 3D ANALYZER.** 2017. Register number: BR512017000933-3. Brazilian National Institute of Industrial Property (INPI).
2. CORREA, G.; RIBEIRO, E.; ZATT, B.; PALOMINO, D.; AGOSTINI, L.; PORTO, M.. **Colorful Blocks - Video Codec Feature Viewer.** 2022. Register number: 512022001767-9. Brazilian National Institute of Industrial Property (INPI).

Thesis and Dissertation Supervision (Concluded Only)

Ph.D. Thesis

1. Alex Machado Borges. **Desenvolvimento de Soluções Baseadas em Aprendizado de Máquina para Transcodificação de Vídeo Acelerada ao Formato AOMedia Video 1 (Development of Machine Learning-Based Solutions for Accelerated Video Transcoding to the AOMedia Video 1 Format).** 2023. Ph.D. Thesis. Federal University of Pelotas. Advisor: Guilherme Ribeiro Corrêa.
2. Narúsci dos Santos Bastos. **Avaliação Objetiva de Qualidade de Imagem e Vídeo 3D de Referência Completa Utilizando Técnicas de Aprendizado de Máquina baseadas em Árvore de Decisão (Objective Assessment of Full-Reference Image and 3D Video Quality Using Machine Learning Techniques Based on Decision Trees).** 2023. Ph.D. Thesis. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
3. Isis Duarte Bender. **Controle Adaptativo de Complexidade do Codificador AVI baseado em Frente de Pareto e**

- Aprendizado de Máquina (**Adaptive Complexity Control of AVI Encoder Based on Pareto Front and Machine Learning**). 2023. Ph.D. Thesis. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
4. Marcel Moscarelli Corrêa. **Heuristic-based Algorithms and Hardware Designs for Fast Intra-picture Prediction in AVI Video Coding**. 2023. Ph.D. Thesis. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
 5. Cristiano Flores dos Santos. Compressão de Nuvens de Pontos Dinâmicas: Uma Abordagem Eficiente para a Etapa de Predição (**Dynamic Point Cloud Compression: An Efficient Approach for the Prediction Stage**). 2020. Ph.D. Thesis. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
 6. Roberta de Carvalho Nobre Palau. Investigação de Soluções em Hardware para os Filtros de Laço do Decodificador AVI (**Investigation of Hardware Solutions for AVI Decoder Loop Filters**). 2017. Ph.D. Thesis. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.

Master Dissertation

1. Gilberto Kreisler Franco Neto. Melhoria de Qualidade de Vídeo Comprimido: Soluções com Redes Neurais Profundas para Múltiplos Codecs (**Enhancing Compressed Video Quality: Deep Neural Network Solutions for Multiple Codecs**). 2024. Master Dissertation. Federal University of Pelotas. Advisor: Guilherme Ribeiro Corrêa.
2. Paulo Henrik Ribeiro Gonçalves. Um Esquema Rápido Baseado em Aprendizado de Máquina para a Predição Interquadros do Codificador de Vídeo VVC (**A Fast Machine Learning-Based Scheme for Inter-frame Prediction in VVC Video Encoder**). 2021. Master Dissertation. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
3. Thiago Luiz Alves Bubolz. Particionamento de Quadros Intra no Codificador Versatile Video Coding (VVC) Utilizando Redes Neurais Profundas (**Intra-frame Partitioning in Versatile Video Coding (VVC) Encoder Using Deep Neural Networks**). 2021. Master Dissertation. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
4. Adson Ileon Ripinski Duarte. Redução de Complexidade do Processo de Decisão de Modo da Predição Intra-Quadro do Codificador de Vídeo VVC utilizando Aprendizado de Máquina (**Reducing Complexity of Intra-frame Prediction Mode Decision Process in VVC Video Encoder using Machine Learning**). 2021. Master Dissertation. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
5. Douglas Silva Corrêa. HCLE: Codificador de Light Fields para Altas Taxas de Compressão com Predição Baseada em Optical Flow e Phase Correlation (**HCLE: Light Field Encoder for High Compression Rates with Optical Flow and Phase Correlation-Based Prediction**). 2021. Master Dissertation. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
6. Mateus Mendes Gonçalves. Esquema de Predição Intraquadro para a Compressão de Nuvens de Pontos no Point Cloud Codec (**Intra-frame Prediction Scheme for Point Cloud Compression in Point Cloud Codec**). 2020. Master Dissertation. Federal University of Pelotas. Advisor: Guilherme Ribeiro Corrêa.
7. Lucas Barreiro Agostini. Avaliação da Perspectiva do Usuário em Interfaces Tangíveis: Um Estudo Comparativo em Sistemas Baseados em Hardware Específico e Sistemas Mediados por Software (**User Perspective Evaluation in Tangible Interfaces: A Comparative Study in Hardware-Specific and Software-Mediated Systems**). 2020. Master Dissertation. Federal University of Pelotas. Coadvisor: Guilherme Ribeiro Corrêa.
8. Alex Machado Borges. Soluções para Redução de Complexidade da Transcodificação de Vídeos HEVC para AVI (**Solutions for Complexity Reduction in HEVC to AVI Video Transcoding**). 2019. Master Dissertation. Federal University of Pelotas. Advisor: Guilherme Ribeiro Corrêa.

Participation in Scientific Societies

2020 – today **Institute of Electrical and Electronics Engineers (IEEE)**

- IEEE Senior Member, since 2020.
- Member of the IEEE CASS Multimedia Systems Applications Technical Committee (MSA-TC), 2021-2025 term.
- Vice-coordinator of the IEEE CASS Rio Grande do Sul Chapter, 2024-2026 term.

2018 – today **Brazilian Computer Science Society (SBC)**

- Institutional Representative of UFPEL at SBC, since 2018.
- Elected member of the "Steering Committee of the Special Commission for the Design of Circuits and Integrated Systems" (CECCI), 2021-2025 term.

2018 – today Brazilian Microelectronics Society (SBMicro)

- Institutional Representative of UFPEL in the Support Program for Integrated Circuit Projects in Universities (APCI).

2018 – today Brazilian National Standards Organization (ABNT)

- Member of the CE-021:000.029 Study Committee (Audio, Image, Multimedia, and Hypermedia Coding Study Committee)

Conference Organization and Journal Committees

Conference Organization

1. 6th IEEE Seasonal School on Digital Processing of Visual Signals and Applications (DPVSA). Program Chair. 2022. <https://wp.ufpel.edu.br/dpvs2022/>
2. Chip in the Minuano 2022 (SBCCI, SBMicro, SForum, WCAS, INSCIT). Finance Chair. 2022. <https://www.ufrgs.br/chip-in-the-minuano/>
3. IEEE International Symposium on Circuits and Systems (ISCAS). Special Session Chair (Algorithms & Hardware for Low-complexity Visual Signal Processing). 2022. <https://iscas2022.org/>
4. 35th Symposium on Integrated Circuits and Systems Design (SBCCI). Track Chair (Visual Signal Processing Systems). 2022. <https://www.ufrgs.br/chip-in-the-minuano/>
5. 5th IEEE Seasonal School on Digital Processing of Visual Signals and Applications (DPVSA). General Chair. 2021. <https://wp.ufpel.edu.br/dpvs2021/>
6. 4th IEEE Seasonal School on Digital Processing of Visual Signals and Applications (DPVSA). Publicity Chair 2020. <https://wp.ufpel.edu.br/dpvs20/>
7. Chip in the Pampa 2018 (SBCCI, SBMicro, SForum, WCAS, INSCIT, FEEC). Exhibition Fair Chair. 2018. <https://wp.ufpel.edu.br/chipinthepampa2018/>
8. XXIV Brazilian Symposium on Multimedia Systems and Web (WebMedia). Coordinator of the XIV Workshop on Undergraduate Research Projects (WTIC). 2017. <https://webmedia.org.br/2018/en/2017/>
9. 7th IEEE CASS Rio Grande do Sul Workshop. Publication Chair. 2017. <https://www.inf.ufrgs.br/cassw/cassw2017>

Journal Committees (Editorial and Review Committees)

1. **IEEE Transactions on Circuits and Systems For Video Technology**
Associate Editor, 2021 - 2023
2. **IEEE Transactions on Multimedia**
Reviewer, 2012 - today
3. **IEEE Transactions on Circuits and Systems for Video Technology**
Reviewer, 2013 - today
4. **IEEE Access**
Reviewer, 2017 - today
5. **Journal of Real-Time Image Processing**
Reviewer, 2017 - today
6. **IEEE Transactions on Image Processing**
Reviewer, 2020 - today
7. **Multimedia Tools and Applications**
Reviewer, 2016 - today
8. **IEEE Transactions on Circuits and Systems I-Regular Papers**
Reviewer, 2020 - today
9. **IEEE Signal Processing Letters**
Reviewer, 2020 - today
10. **Multimedia Systems**
Reviewer, 2019 - today

11. **Signal Processing-Image Communication**
Reviewer, 2022 - today
12. **IEEE Open Journal of Signal Processing**
Reviewer, 2023-today

Awards

1. Research Productivity Fellow - Brazilian National Council for Scientific and Technological Development (CNPq), 2023.
2. Best Undergraduate Work (Advisor) - Article "Multi-Size Inverse DCT-II Hardware Design for the VVC Decoder" - 38th South Symposium on Microelectronics (SIM 2023), IEEE Circuits and Systems Society, 2023.
3. Honorable Mention (Advisor) - Article "4K UHD@60fps Design for the VVC Affine Motion Estimation Reconstructor" - SBCCI 2023, SBC (Brazilian Computing Society), and SBMicro (Brazilian Microelectronics Society), 2023.
4. Honorable Mention (Advisor) - Article "A Machine Learning-Based Solution to Accelerate the Intra Mode Decision for the VVC Standard", XXIX Brazilian Symposium on Multimedia Systems and Web (WebMedia'23), 2023.
5. Best Graduate Work (Advisor) - Article "Multiple Transform Hardware Architecture for Versatile Video Coding" - 37th South Symposium on Microelectronics (SIM 2022), IEEE Circuits and Systems Society, 2022.
6. Honorable Mention (Advisor) - Article "Direction-Based Fast Mode Decision and Hardware Design for the AV1 Intra Prediction" - SBCCI 2022, SBC (Brazilian Computing Society), and SBMicro (Brazilian Microelectronics Society), 2022.
7. Best Poster, Graduate Work (Advisor) - Poster: "A Hardware-Friendly and Configurable Heuristic Targeting VVC Inter-Frame Prediction" - 6th DPVSA, IEEE Signal Processing Society, 2022.
8. Best Poster, Graduate Work (Advisor) - Poster: "High-Throughput Multifilter VLSI Design for the AV1 Fractional Motion Estimation" - 6th DPVSA, IEEE Signal Processing Society, 2022.
9. 3rd Best Poster Award, Undergraduate Work (Advisor) - Poster "Fast Decisions for VVC Partitioning with Random Forests" - 5th DPVSA, IEEE Signal Processing Society, 2021.
10. 2nd Best Poster Award, Graduate Work (Advisor) - Poster "Heuristic Based Solution for Cost Reduction of SAD/SSE Operations in AV1 Intra Prediction" - 5th DPVSA, IEEE Signal Processing Society, 2021.
11. 3rd Best Poster Award, Graduate Work (Advisor) - Poster "Block-Based Inter-Frame Prediction for Dynamic Point Cloud Compression" - 5th DPVSA, IEEE Signal Processing Society, 2021.
12. Best Paper Award (Advisor) - Article "Directional Intra Frame Prediction Architecture with Edge Filter and Upsampling for AV1 Video Coding" - 33rd SBCCI, SBC (Brazilian Computing Society), and SBMicro (Brazilian Microelectronics Society), 2020.
13. Best Poster Award (Advisor) - Poster "A DBF Hardware Architecture for the AV1 Decoder" - 4th DPVSA, IEEE Signal Processing Society, 2020.
14. 2nd Best Poster Award, Undergraduate Work (Advisor) - Poster "Directional Intra Frame Prediction Architecture with Edge Filter and Upsampling for AV1 Video Coding" - 10th CASSW, IEEE Circuits and Systems Society, 2020.
15. Best Poster Award, Graduate Work (Advisor) - 10th IEEE CASS Rio Grande do Sul Workshop (CASSW), IEEE Circuits and Systems Society, 2020.
16. IEEE Senior Member, Institute of Electrical and Electronics Engineers (IEEE), 2020.
17. Best Paper Award (Advisor) - Article "HEVC Video Coding Using Decision Trees for a Memory-Friendly Tiles Workload Balance" - 34th South Symposium on Microelectronics (SIM 2019), SBC (Brazilian Computing Society), and SBMicro (Brazilian Microelectronics Society), 2019.
18. Best Paper Award (Advisor) - 18th Students Forum on Microelectronics (SFORUM 2018), SBC (Brazilian Computing Society), and SBMicro (Brazilian Microelectronics Society), 2018.
19. Best Paper Award - Article "Classification-based early termination for coding tree structure decision in HEVC" - 21st IEEE International Conference on Electronics, Circuits, and Systems (ICECS 2014), IEEE Circuits and Systems Society, 2014.
20. Best Paper Award - Article "Transient Fault-Tolerant Fast Adders Implemented in FPGAs" - 8th Students Forum on Microelectronics (SFORUM 2008), SBC (Brazilian Computing Society), and SBMicro (Brazilian Microelectronics Society), 2008.