



**COLLEGE OF ENGINEERING
AND COMPUTER SCIENCE**
FLORIDA ATLANTIC UNIVERSITY

Announces the Ph.D. Dissertation Defense of

Luiz Zaniolo

for the degree of Doctor of Philosophy (Ph.D.)

“Deep Learning Architectures and Applications in the Context of Edge Computing”

October 20, 2021, 4:00 p.m.
Virtual Dissertation

DEPARTMENT:

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ABSTRACT OF DISSERTATION

Deep Learning Architectures and Applications in the Context of Edge Computing

The recent rise of artificial intelligence (AI) using deep learning networks allowed the development of automatic solutions for many tasks that, in the past, were seen as impossible to be performed by a machine. However, deep learning models are getting larger, need significant processing power to train, and powerful machines to use it. As deep learning applications become ubiquitous, another trend is taking place: the growing use of edge devices. This dissertation addresses selected technical issues associated with edge AI, proposes novel solutions to them, and demonstrates the effectiveness of the proposed approaches. The technical contributions of this dissertation include: (i) architectural optimizations to deep neural networks, particularly the use of patterned stride in convolutional neural networks used for image classification; (ii) use of weight quantization to reduce model size without hurting its accuracy; (iii) systematic evaluation of the impact of image imperfections on skin lesion classifiers' performance in the context of teledermatology; and (iv) a new approach for code prediction using natural language processing techniques, targeted at edge devices.

BIOGRAPHICAL SKETCH

Born in Curitiba, Brazil

B.S., Universidade Tecnológica Federal do Parana, Curitiba, Brazil, 1994

M.S., Florida Atlantic University, Boca Raton, Florida, 2004

Ph.D., Florida Atlantic University, Boca Raton, Florida, 2021

**CONCERNING PERIOD OF PREPARATION
& QUALIFYING EXAMINATION**

Time in Preparation: 2013 - 2021

Qualifying Examination Passed: Spring 2017

Published Papers:

L. Zaniolo, O. Marques, “On the use of variable stride in convolutional neural networks”, Multimedia Tools and Applications, 2020 - Springer

L. Zaniolo, O. Marques, "On the Use of Convolutional Neural Networks with Patterned Stride for Medical Image Analysis", Machine GRAPHICS & VISION, 2021

K. Maier, L. Zaniolo, O. Marques, "Image quality issues in teledermatology: A comparative analysis of artificial intelligence solutions", Journal of the American Academy of Dermatology, 2021 – Elsevier

L. Zaniolo, C. Garbin, O. Marques, "Deep learning for edge devices", under review