

# ANDERSON R. AVILA

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## SUMMARY

Assistant Professor

Machine Learning for Cybersecurity

My research lies on the development of methodologies, techniques and tools to foster cybersecurity from the perspective of recent developments of Artificial Intelligence (AI).

Previously, I worked as a Machine Learning Research Scientist in natural language and speech processing at Huawei Technologies, Noah's Ark Lab.

I mainly worked on projects related to low-latency and robustness of spoken language understanding.

My research interests include: data privacy, information integrity and biometrics robustness.

## WORK EXPERIENCE

INRS-EMT

Assistant Professor, Quebec, Canada

October 2022–Present

- Researching advances and open problems in **Federated Learning**
- Exploring human language technologies to combat **Misinformation**
- Mitigating the use of deepfake signals towards **Biometric Systems**

Huawei Technologies Ltd., Noah's Ark Lab

Machine Learning Researcher, Quebec, Canada

October 2020 - October 2022

- Researched on low-latency and compact spoken language understanding models for edge devices
- Supervised undergraduate and graduate students
- Minimized the gap between research and product team with innovative research towards real-world scenarios

Computer Research Institute of Montréal (CRIM)

Research Intern, Quebec, Canada

January 2018–June 2019

- Investigated countermeasures to mitigate spoofing attacks towards voice biometrics
- Proposed a perceptual speech quality measure based on i-vectors

Microsoft Research, Audio and Acoustics Research Group

Research Intern, Seattle, USA

July 2018–October 2018

- Developed an audio quality evaluation dataset
- Explored deep neural network models for non-intrusive audio quality assessment

## ACHIEVEMENTS



Merit Scholarship for Foreign Student

Ranked 2nd – Quebec, Canada, 2015



Emerging Leaders in the Americas

Quebec, Canada, 2014



SYTaCom scholarship

Quebec, Canada, 2013

## EDUCATION

PhD - Telecommunication

INRS-EMT

2015–2020

Quebec, Canada

**Thesis:** Signal processing and machine learning for robust in-the-wild voice applications

**Supervisor:** Prof. Tiago H. Falk & Prof. Douglas O'Shaughnessy

Msc - Information Engineering

Federal University of ABC

2012–2014

São Paulo, Brazil

**Thesis:** Gaussian Mixture Models and I-vector for Speaker Verification under Mismatched Conditions

**Supervisor:** Francisco J. Fraga

Bsc - Computer Science

Federal University of São Carlos

1999–2006

São Carlos, Brazil

## TEACHING

- 2 years of experience teaching mathematics and physics at high school level
- 6 months of experience teaching web development

## COURSES

Postgraduate certificate - Information Systems

Federal University of ABC

2009–2011

São Paulo, Brazil

## RECENT PUBLICATIONS

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[J1] A. Avila, O'Shaughnessy, T. Falk, *Automatic Speaker Verification from Affective Speech Using Gaussian Mixture Model Based Estimation of Neutral Speech Characteristics*, J. Speech Communication, vol. 132, p. 21-31, 2021.

[J2] A. Avila, J. Alam, F. Prado, D. O'Shaughnessy, T. Falk, *On the use of blind channel response estimation and a residual neural network to detect physical access attacks to speaker verification systems*, J. Computer Speech & Language, vol. 66, 2021.

[J3] A. Avila, J. Alam, D. O'Shaughnessy, T. Falk, *On the Use of the I-vector Speech Representation for Instrumental Quality Measurement*, J. Quality and User Experience, Vol. 5, No. 6, 2020.

[J4] A. Avila, D. O'Shaughnessy, T. Falk, *Non-intrusive Speech Quality Prediction Based on the Blind Estimation of Clean Speech and the i-vector Framework*, J. Quality and User Experience, vol. 5, no 1, p. 1-15, 2020.

[J5] B. Sadou, A. Lahoulou, T. Bouden, A. Avila, T. Falk, Z. Akhtar, *Free-Reference Image Quality Assessment Framework using Metrics Fusion and Dimensionality Reduction*, Signal & Image Processing, Vol. 10, No. 5, Oct. 2019.

[J6] A. Avila, Z. Akhtar, J. Santos, D. O'Shaughnessy, T. Falk, *Feature Pooling for Spontaneous Speech-Based Emotion Recognition in-the-wild*, IEEE Transaction on Affective Computing, Vol. 12, No.1, 2018, pp. 177-188, 2018.

[C1] A. Avila, Y. Cao, C. XING. *Multimodal Audio-textual Architecture for Robust Spoken Language Understanding*, ACL 2022 (submitted).

[C2] C. XING, et al. *Speech-MLP: A Simple MLP Architecture for Speech Processing*, ICLR 2022 (submitted).

[C3] A. Avila, et al. *Low-bit Shift Network for End-to-End Spoken Language Understanding*, ICASSP 2022 (submitted).

[C4] N. Potdar, A. Avila, C. XING, et al. *A Streaming End-to-End Framework For Spoken Language Understanding*, IJCAI 2021.

[C5] Y. Cao, N. Potdar, and A. Avila. *Sequential End-to-End Intent and Slot Label Classification and Localization*, Interspeech 2021.

[C6] A. Avila, J. Alam, D. O'Shaughnessy, T. Falk, *Intrusive Quality Measurement of Noisy and Enhanced Speech based on i-Vector Similarity*, QoMEX 2019. **\*Nominated for Best Paper Award\***

[C7] A. Avila, H. Gamper, C. Reddy, R. Cutler, I. Tashev, J. Gehrke, *Non-intrusive speech quality assessment using neural networks*, ICASSP 2019.

[C8] A. Avila, J. Alam, D. O'Shaughnessy, T. Falk, *Blind Channel Response Estimation for Replay Attack Detection*, Interspeech 2019.

[C9] A. Avila, S. Kshirsagar, A. Tiwari, D. Lafond, D. O'Shaughnessy, and T. Falk, *Speech-Based Stress and Emotion Classification Based on Modulation Spectral Features and Convolutional Neural Networks*, EUSIPCO 2019.

[C10] A. Avila, J. Alam, D. O'Shaughnessy, T. Falk, *Investigating Speech Enhancement and Perceptual Quality for Speech Emotion Recognition*, accepted, Interspeech 2018.

[C11] A. Avila, J. Monteiro, D. O'Shaughnessy, T. Falk, *Speech Emotion Recognition on Mobile Devices Using a Modulation Spectrum Pooling and Deep Neural Networks*, ISSPIT 2017.