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Juan Camilo Vásquez Correa

MSc.

About me I received the B.S. degree in Electronics Engineering from University of Antioquia (Medellin, Colombia) in 2013, and the MSc in Telecommunications Engineering at the same institution in 2016. Currently I am a PhD student at the Pattern recognition lab of the Friedrich Alexander University Erlangen-Nuremberg (Germany). I have performed research and development (R&D) activities related to signal processing, natural language processing, and machine learning for applications in healthcare and biometrics since five years now, both in academic and industrial partners like Telefonica research or the center of speech and language processing of Johns Hopkins University.

My main professional aim is to develop scientific and technological knowledge to provide efficient solutions to the challenges of the current society. My research interests include Speech Processing, Machine Learning, Deep Learning, Data science, Signal Processing, and Natural language processing.

Experience

May. 2018. - Present

Pattern recognition Lab, University of Erlangen, Staff researcher

Research activities in speech and natural language processing for medical applications.

<https://www5.cs.fau.de/en/our-team/vasquez-camilo>

Aug. 2016. - Present

Department of Electronics and Telecommunications Engineering, University of Antioquia, Colombia. Lecturer

Teaching activities: digital signal processing

Apr. 2016 - Sep. 2016.

Faculty of Engineering, University of Antioquia, Colombia. Software developer

Software development for speech processing for clinical applications.

2016

Johns Hopkins University, Baltimore, USA. Graduate Visiting Scholar

Member of a team in the 2016 Jelinek Memorial Summer Workshop on Speech and Language Technologies.

2015

Telefónica Research, Barcelona, Spain. Intern Researcher

Research in speech processing in noisy conditions for medical applications.

Education

2018 - Present, University of Erlangen

PhD. in Computer Science.

Research Topic: combination of speech and natural language processing for medical applications

Advisor: Prof. Dr. Ing. Elmar Nöth
elmar.noeth@fau.de

2017 - Present, University of Antioquia

PhD. in Electronics and Computer Science.

Research Topic: Speech processing for medical applications

Advisor: Prof. Juan Rafael Orozco Arroyave
rafael.orozco@udea.edu.co

2014 - 2016, University of Antioquia

MSc. Telecommunication Engineering. GPE: 4.81/5.0

Research Topic: Digital Signal Processing.

2007 - 2013, University of Antioquia

BSc. Electronic Engineering. GPE: 4.05/5.0

Area: Telecommunications.

Software

Phonet: Python framework based on bidirectional gated recurrent neural networks for phoneme recognition and to compute phonological posterior probabilities from speech signals.

Python, Keras.

<https://github.com/jcvasquezc/phonet>

Apkinson: Android application for the continuous monitoring of the neurological state of patients with Parkinson's disease.

Android.

<https://github.com/jcvasquezc/SMA2/tree/develop>

NeuroSpeech: Open source software platform designed to perform speech analysis of people with neuro-degenerative disorders.

Qt, C++, Python.

<https://github.com/jcvasquezc/NeuroSpeech>

Disvoice: Python framework for feature extraction of pathological speech.

Python.

<https://github.com/jcvasquezc/DisVoice>

Languages

English (B2), German (Basic), Spanish (Native)

Areas of Interest and Skills

Machine Learning, Deep learning, Data analysis, Predictive modeling, Data visualization, Statistics, Natural Language processing.

Programming Languages

- Python: 5+ years
- Matlab: 5+years
- Linux-Bash:
- 3+years
- Android. 2+years
- C/C++: 2+years
- Java
- HTML

Tools/Frameworks

Pytorch (python), Keras (python), Scikit-learn (python), Kaldi (bash), Flask (python), Pandas, Numpy, MongoDB, Matplotlib, Qt (C++), Git, LaTeX.

Community

Organization/Groups

- Member of **Marie Curie Alumni Association (MCAA)**
- Member of **International speech and communication association (ISCA)**

Achievements

1. IEEE signal processing society travel grant to attend ICASSP conference 2017. January 2017.
2. ISCA student grant to attend the INTERSPEECH conference 2015. International Speech and Communication Association. June 2015.
3. Young researcher and innovator COLCIENCIAS, Colombian government. February, 2014.

Projects

Research and innovation programme under Marie Skłodowska-Curie actions: European Union's Horizon 2020 (2018-2021)

TAPAS – Training Network on Automatic Processing of Pathological Speech.
Role in project: Graduate Student.

CODI: University of Antioquia (2019)

Analysis of architectures based on deep learning methods to evaluate and recognize traits in speech signals.

Role in project: Co-researcher.

COLCIENCIAS and Ministry of Communication Technologies: Colombian government (2018)

Study to measure the level of Communication and information technologies (TICs) in the public Health Services institutions of Colombia.

Role in project: Software developer.

CODI: University of Antioquia (2017)

Asynchronous Non-Intrusive Multi-Modal Analysis of Bio-Signals for the Automatic evaluation of the Neurological State of People With Parkinson's Disease.

Role in project: Graduate Student.

COLCIENCIAS: Colombian government (2014-2016)

Analysis of phonation, articulation, and prosody of patients with Parkinson's disease to support diagnosis and monitoring of the patients.

Role in project: Master student.

COLCIENCIAS: Colombian government (2014-2015)

Automatic recognition of emotion from speech signals in non-controlled environments.

Role in project: Young researcher and innovator COLCIENCIAS.

Publications

Journal papers

1. C. D. Rios-Urrego, **J. C. Vásquez-Correa**, et al. Analysis and Evaluation of Handwriting in Patients with Parkinsons Disease Using kinematic, Geometrical, and Non-linear Features. *Computer Methods and Programs in Biomedicine*. Vol 173, pp 43-52, 2019.
2. **J. C. Vásquez-Correa** et al. Multimodal assessment of Parkinson's disease: a deep learning approach IEEE Journal of Biomedical and Health Informatics, 2018 (IN PRESS).
3. **J. C. Vasquez-Correa**, et al. Towards an Automatic Evaluation of the Dysarthria Level of Patients with Parkinson's Disease. *Journal of Communication Disorders*, Vol 76, pp 21-36, 2018.
4. T. Arias-Vergara, **J. C. Vásquez-Correa**, et. al. Speaker models for monitoring Parkinson's disease progression considering different communication channels and acoustic conditions. *Speech Communication* Vol 101, pp 11-25, 2018.
5. M. Cernak, et al. Characterisation of voice quality of Parkinson's disease using differential phonological posterior features. *Computer Speech & Language*, Vol. 46 pp. 196-208, 2017.
6. J. R. Orozco-Arroyave, **J. C. Vásquez-Correa**, et al. NeuroSpeech: an open-source software for Parkinson's speech analysis. *Digital Signal Processing*, Vol. 77, pp. 207-221, 2018
7. T. Arias-Vergara, **J. C. Vásquez-Correa**, J. R. Orozco-Arroyave. Parkinson's disease and aging: analysis of their effect in phonation and articulation of speech. *Cognitive Computation*, Vol. 9, Num. 6, pp. 731748, 2017.

Book chapters and Lecture notes

8. N. Garcia-Ospina, T. Arias-Vergara, **J. C. Vásquez-Correa**, et. al. Phonological i-vectors to detect Parkinsons Disease. *Lecture Notes in Computer Science*, Vol 11107, pp. 462-470 2018.
9. **J. C. Vásquez-Correa**, et al. Phonological posteriors and GRU recurrent units to assess speech impairments of patients with Parkinsons disease. *Lecture Notes in Computer Science*, Vol 11107, pp. 453-461 2018.
10. P. A. Prez-Toro, **J. C. Vásquez-Correa**, et al. A Non-linear Dynamics Approach to Classify Gait Signals of Patients with Parkinsons Disease. *Communications in Computer and Information Science*, Vol 916, pp. 268-278, 2018.
11. L. F. Parra-Gallego, T. Arias-Vergara, **J. C. Vásquez-Correa**, et al. Automatic Intelligibility Assessment of Parkinsons Disease with Diadochokinetic Exercises. *Communications in Computer and Information Science*, Vol 916, pp. 223-230, 2018.
12. **J. C. Vásquez-Correa**, et al. Speaker Model to Monitor the Neurological State and the Dysarthria level of Patients with Parkinson's Disease. *Lecture Notes in Computer Science*, Vol 10415, pp. 272-280. 2017.
13. N. García, **J. C. Vásquez-Correa**, et al. Language Independent Assessment of Motor Impairments of Patients with Parkinson's Disease using i-vectors. *Lecture Notes in Computer Science*, Vol 10415, pp. 147-155. 2017.
14. T. Arias-Vergara, **J. C. Vásquez-Correa**, et al. Parkinson's disease progression assessment from speech using a mobile device-based application. *Lecture Notes in Computer Science*, Vol 10415, pp. 371-379. 2017
15. J. C. Jimenez-Monsalve, **J.C. Vásquez-Correa**, et al. Phonation and Articulation Analyses in Laryngeal Pathologies, Cleft Lip and Palate, and Parkinson Disease. *Biomedical Applications Based on Natural and Artificial Computing*, Springer. Vol 10338, pp. 424-434. 2017.
16. **J.C. Vásquez-Correa**, et al. Non-linear Dynamics Characterization from Wavelet Packet Transform for Automatic Recognition of Emotional Speech. *Smart Innovation, Systems and Technologies*. Springer. Vol 48, pp. 199-207. Springer, 2016.
17. **J.C. Vásquez-Correa**, et al. Time Dependent ARMA for Automatic Recognition of Fear-type Emotions in Speech. *Lecture Notes in Artificial Intelligence*. Vol 9302, pp. 110-118. Springer, Sept, 2015.

Conference proceedings

18. T. Arias-Vergara, J. C. Vázquez-Correa, et al. Unobtrusive Monitoring of Speech Impairments of Parkinson's Disease Patients Through Mobile Devices. *43rd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Calgary (Canada), 2018
19. J. C. Vázquez-Correa, et al. A Multitask Learning Approach to Assess the Dysarthria Severity in Patients with Parkinson's Disease. *19th International Conference of the Speech and Communication Association (INTERSPEECH)*, Hyderabad (India), 2018
20. N. Garcia-Ospina, J. C. Vázquez-Correa, J. R. Orozco-Arroyave, and E. Nth. Multimodal i-vectors to Detect and Evaluate Parkinson's Disease. *19th International Conference of the Speech and Communication Association (INTERSPEECH)*, Hyderabad (India), 2018
21. J. C. Vázquez-Correa, et al. Multi-view Representation Learning via GCCA for Multimodal Analysis of Parkinson's Disease *42nd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, New Orleans (USA), 2017.
22. J. C. Vázquez-Correa, et al. Effect of Acoustic Conditions on Algorithms to Detect Parkinson's Disease. *42nd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, New Orleans (USA), 2017.
23. M. Cernak, et al. On the impact of non-modal phonation on phonological features. *42nd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, New Orleans (USA), 2017.
24. J. C. Vázquez-Correa, et al. Convolutional Neural Network to Model Articulation Impairments in Patients with Parkinson's Disease. *18th International Conference of the Speech and Communication Association (INTERSPEECH)*, Stockholm (Sweden), 2017.
25. P. Klumpp, et al. Apkinson A mobile monitoring solution for Parkinsons disease. *18th International Conference of the Speech and Communication Association (INTERSPEECH)*, Stockholm (Sweden), 2017.
26. T. Arias-Vergara, J. C. Vázquez-Correa, et al. Parkinson's disease progression assessment from speech using GMM-UBM. *17th International Conference of the Speech and Communication Association (INTERSPEECH)*, San Francisco (USA), 2016.
27. J. R. Orozco-Arroyave, J. C. Vázquez-Correa, et al. Towards an Automatic Monitoring of the Neurological State of Parkinsons Patients from Speech. *41st IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Shanghai (China), 2016.
28. J. C. Vázquez-Correa, et al. Wavelet-Based Time-Frequency Representations for Automatic Recognition of Emotions from Speech. *12th ITG Conference on Speech Communication*, pp.1-5, Paderborn (Germany), 2016.
29. T. Arias-Vergara, et al. Genderdependent GMMUBM for tracking Parkinsons disease progression from speech. *12th ITG Conference on Speech Communication*, pp.1-5, Paderborn (Germany), 2016.
30. J. C. Vázquez-Correa, et al. Word Accuracy and Dynamic Time Warping to Assess Intelligibility Deficits in Patients with Parkinson's Disease. *21st IEEE Symposium on Image, Signal Processing and Artificial Vision (STSIVA)*, Bucaramanga (Colombia), 2016.
31. P. A. Perez-Toro, J. C. Vázquez-Correa, et al. Análisis motriz en las extremidades inferiores para el monitoreo del estado neurológico de pacientes con enfermedad de Parkinson. *21st IEEE Symposium on Image, Signal Processing and Artificial Vision (STSIVA)*, Bucaramanga (Colombia), 2016.
32. J. C. Vázquez-Correa, et al. Automatic Detection of Parkinson's Disease from Continuous Speech Recorded in Non-Controlled Noise Conditions. *16th Annual Conference of the Speech and Communication Association (INTERSPEECH)*, Dresden (Germany), 2015.
33. J. C. Vázquez-Correa, et al. Emotion Recognition from Speech under Environmental Noise Conditions using Wavelet Decomposition. *49th IEEE International Carnahan Conference on Security Technology (ICCST)*, Taipei (Taiwan), 2015.
34. N. García, J. C. Vázquez-Correa, et al. Automatic Emotion Recognition in Compressed Speech Using Acoustic and Non-Linear Features. *20th IEEE Symposium of Image, Signal Processing, and Artificial Vision. (STSIVA)*. Bogotá (Colombia), 2015.
35. J. C. Vázquez-Correa, et al. Evaluation of wavelet measures on automatic detection of emotion in noisy and telephony speech signals. *48th. IEEE International Carnahan Conference on Security Technology (ICCST)*, Rome (Italy), 2014.
36. N. García, J. C. Vázquez-Correa, et al. Evaluation of the effects of speech enhancement algorithms on the detection of fundamental frequency of speech. *19th IEEE Symposium of Image, Signal Processing, and Artificial Vision. (STSIVA)*, Armenia (Colombia), 2014.
37. J. C. Vázquez-Correa, et al. Design and implementation of an Embedded System for Real Time Analysis of Speech from People with Parkinson's Disease. *18th IEEE Symposium of Image, Signal Processing, and Artificial Vision. (STSIVA)*, Bogotá, (Colombia) 2013.