Abner Hernandez

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Computational Linguist

My research involves linguistics, speech recognition, speech processing, natural language processing and artificial intelligence. In particular, I am interested in applying machine and deep learning techniques in the speech and language domain. My bachelor's and master's programmes involved an interdisciplinary study of linguistics, psychology, health and computational methods.

Education

Seoul National University, Seoul, South Korea - MA Linguistics

Sept 2018 - Aug 2020

- **Thesis Title**: *Automatic Detection and Assessment of Dysarthric Speech using Prosody-Based Measures*
- Member of Spoken Language Processing Lab.
- Held seminars to help students learn how to use python for machine and deep learning along with speech recognition toolkits such as Kaldi and PyTorch-Kaldi.
- **Relevant Courses**: Computational Linguistics, Spoken Language Processing, Attention Mechanisms in Deep Learning-Based Speech Recognition, ASR using Deep Learning, Deep Learning for Spoken Language Processing Applications Using Python, Advanced Phonetics
- Published 2 journal and 2 conference papers, including one paper for the special issue "*Advances of Biomedical Signal Processing for Disease Diagnosis, Prognosis or Severity Determination*" in the Applied Sciences journal.

Simon Fraser University, Vancouver, Canada - BA Linguistics (Honours)

Sept 2013 - Jun 2017

- **Thesis Title**: *Late and Early Bilingual Perception of Korean Stop and Affricate Contrast*
- Member of Language and Brain Lab.
- Minor in Psychology, Certificate in the Linguistics of Speech Science
- **Relevant Courses**: Computer Science and Programming, Neurolinguistics, Psycholinguistics, Biological Psychology, Cognitive Psychology, Developmental Psychology, Cognitive Neuroscience, Health Psychology, Human Neuropsychology, Science of Speech, Phonetics, Phonology.

Research Experience

FAU Erlangen-Nürnberg, Erlangen, Germany - Pattern Recognition Lab

April 2021 - Current

- **Project**: DAAD International Programmes Digital
- **Project Goal:** Improve the accessibility of video lectures for an international audience. Apply machine learning techniques for speech and data processing.

Spoken Language Processing Lab, Seoul National University

Dec 2018 - Sept 2020

- **Project Info**: *Accessible and Intelligent Solution Technology Development for Communication Disabilities.*
  - Supported by the Ministry of Culture, Sports and Tourism along with the Korea Creative Content Agency; funding sized $300,000.
  - Collaboration with Gwangju Institute of Science and Technology and Solegate IT company.
- **Project Goal**: Develop a platform for individuals with developmental disabilities in order to allow easier access to social networks and facilitate sharing capabilities.
- **Role**: Linguistics analysis of Cerebral Palsy-based impaired speech for diagnosis. Improving ASR technology of individuals with dysarthric speech to incorporate in the project's platform.

Professional Experience

Saltlux Inc, Seoul, South Korea - Speech AI Researcher

Nov 2020 - Feb 2021

- Saltlux is an AI company specializing in NLP and big data services.
- My tasks involve developing an end-to-end speech recognition system for the Korean language. Specifically, test out different architectures such as CTC/Attention and transformer-based acoustic models. Along with testing different hyper-parameters, vocabulary types, and data augmentation methods.

Awards + Other Activities

- Ken Caple Scholarship for students with a 3.7+/4.33 GPA (2013)
- Korean Government Scholarship Program (2017-2020)
  - Fully-funded 2-year graduate scholarship including tuition, a living stipend and a 1-year Korean language course.
- Reviewer for the Phonetics and Speech Sciences Journal (2020).
- Volunteer for the Augmentative and Alternative Communication conference (2019)
- Volunteer for the Speech Science & Auditory joint workshop (2019)

Skills

Computer Languages: Python, R, bash script, basic Java

Tool-kits & Libraries: Sci-kit Learn (machine learning library), Kaldi (speech recognition toolkit), ESPnet (end-to-end speech processing toolkit). Experience with PyTorch and Tensorflow deep learning frameworks.

Languages: English, Spanish, Korean

Publications

* Hernandez, A., Kim, S., & Chung, M. (2020). Prosody-based measures for automatic severity assessment of dysarthric speech. Applied Sciences, 10(19), 6999.

Hernandez, A., Yeo, E.J., Kim, S., Chung, M. (2020) Dysarthria Detection and Severity Assessment Using Rhythm-Based Metrics. Proc. Interspeech 2020, 2897-2901.

Hernandez, A., Chung, M.H. Dysarthria Classification Using Acoustic Properties of Fricatives. In Proceedings of the Seoul International Conference on Speech Sciences (SICSS), Seoul, Korea, 15–16 November 2019; pp. 43–44.

Hernandez, A., Lee, H. Y., & Chung, M. (2019). Acoustic analysis of fricatives in dysarthric speakers with cerebral palsy. Phonetics and Speech Sciences, 11(3), 23-29.

* Applied Biosciences and Bioengineering section for the special issue "Advances of Biomedical Signal Processing for Disease Diagnosis, Prognosis or Severity Determination."