Nhan Duc Thanh Nguyen

PhD · Electrical and Computer Engineering

Serior DSP engineer with 8 years of working experience in Signal Processing and Embedded Systems

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Education

Aarhus University *Aarhus, Denmark*

PhD Electrical & Computer Engineering *Jun 2021 - Aug 2024*

- Advisor: Prof. Preben Kidmose, Assoc. Prof. Kaare Mikkelsen, Dr. Huy Phan
- Thesis: Detecting attended auditory events using ear-EEG: a new approach to auditory attention decoding

Kyung University *Yongin, South Korea*

M.Eng. Electronics & Information Engineering *Sep 2010 - Aug 2012*

- Advisor: Prof. DongHan Kim
- Thesis: Posture-Gesture combined recognition for Human-Robot interaction

Ho Chi Minh University of Technology *Ho chi Minh, Viet Nam*

B.Eng. Electrical & Electronics Engineering *Sep 2005 - Jul 2010*

- Advisor: Prof. Thuong Le-Tien
- Thesis: Design and implement a water pressure alarm system using GPRS modem via microcontroller ARM LM3S2965

Professional Experience

Aarhus University *Aarhus, Denmark*

Postdoctoral researcher *Oct. 2024 - present*

- Doing research and implementing machine learning, and deep learning algorithms for EEG signal processing, auditory attention decoding, EEG artifact detection.

Aarhus University *Aarhus, Denmark*

PhD researcher *Jun. 2021 - Aug. 2024*

- Doing research and implementing machine learning, deep learning algorithms for EEG signal processing.
- Principle investigator of the PhD project: ***Detecting attended auditory events using ear-EEG: a new approach to auditory attention decoding***. The aim of the project is to develop a novel approach to detect the auditory attention of the human brain in an environment with multiple active talkers. We combined state-of-the-art machine learning methods with joint deep analysis of auditory event-related features of the brain signals and speech signals to determine the attended talker. The research outcome could be applied to modern hearing devices to improve user hearing ability.
- Teaching assistant for various bachelor and master courses.

ForteMedia, Inc *Seongnam, South Korea*

Staff Software Engineer *Jan. 2017 - Oct. 2020*

- Develop and maintain audio processing algorithms: noise suppression, voice activity recognition, spatial filter, beamforming, acoustic echo cancellation, and noise detection.
- Implement and optimize algorithms into different platforms, such as Intel processor, ARM, and Qualcomm QDSP in Samsung smartphones using Assembly and C language.
- Support field engineers to deliver qualitative products to customers.

Korea Institute of Building Energy Technology *Seoul, South Korea*

Sr. RnD Engineer *Oct. 2015 - Dec. 2016*

- Develop a secure camera driver module in Linux system that is used in meetings of the Korean Department of Defense.
- Develop iOS and Android client applications.

Areschan, Inc *Seoul, South Korea*

RnD Engineer *Sep. 2012 - Sep. 2015*

- Develop audio, video, image, e-book search engine in Linux server: creating raw databases, extracting fingerprinting (frequency and energy for audio, histogram for image and e-book), making signatures, and working on detection algorithms.
- Develop client applications in Android to detect audio and video copyrighted content.

Technical skills

- Strong research skills: Technical, scientific reading and writing, presentation, literature review and implementing new algorithms in machine learning and deep learning.
- 8 years of experience in C/C++ programming and 3 years of experience in Python programing.
- Proficient in Matlab and other software tools: git, gitlab, gdb debugger, pdb debugger, Pytorch framework.

Publications

Journal Publications

Nhan D. T. Nguyen, H. Phan, S. Geirnaert, K. Mikkelsen and P. Kidmose, "AADNet: An End-to-End Deep Learning Model for Auditory Attention Decoding", submitted to *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, August. 2024 (in review) [preprint]

Nhan D. T. Nguyen, K. Mikkelsen and P. Kidmose, "Cognitive component of auditory attention to natural speech events", *Frontiers in Human Neuroscience*, Vol. 18, 2024[paper]

Nhan D. T. Nguyen, S.Y. Lee and D.H. Kim, "Two-stage Hidden Markov Model in Gesture Recognition for Human-Robot Interaction", *Int. Journal of Adv. Robotic System*, Vol. 9, 39:2012[paper]

Conference Publications

Nhan D. T. Nguyen, H. Phan, K. Mikkelsen and P. Kidmose, "Single-word auditory attention decoding using Deep Learning model"[preprint]

Nhan D. T. Nguyen, D. Stonier, S.Y. Lee, D.H. Kim, "A New Approach for Human-Robot Interaction Using Human Body Language", *International Conference on Convergence and Hybrid Information Technology*, Daejeon, Korea. Sep. 2011 (LNCS 6935)[paper]

Awards, Fellowships, & Grants

2021-2024	**Ph.D Fellowship**, William Demant Foundation	*€312,000*
2010-2012	**Master Scholarship**, Korean Government IT Scholarship (NIPA)	*€20,000*
2006-2009	**Annual Bachelor Scholarship**, Ho Chi Minh City University of Technology, Vietnam	*€2,000*

Presentations

May 2023. "Event-based Auditory Attention Decoding". *Auditory Attention research group*, KU Leuven, Belgium

Apr. 2023. "Event-based Auditory Attention Decoding". *Symposium on Ear-EEG & Auditory Attention Decoding*, Copenhagen, Denmark

Feb. 2022. "Detecting attended auditory events using ear-EEG: A new approach to auditory attention decoding". *Attention Colloquium*, Eriksholm Research Centre, Denmark

Teaching Experience

Spring 2022, 2023	**Computer Architecture, bachelor course**, Teaching Assistant	*Aarhus University*
Fall 2022, 2023	**Deep Learning, bachelor course**, Teaching Assistant	*Aarhus University*
Spring 2022, 2024	**Advanced Electrophysiology, master course**, Guest lecturer	*Aarhus University*
Spring 2022	**Dicrete-time Signal Processing, bachelor course**, Teaching Assistant	*Aarhus University*