Le Duc Khai

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Research Statement

I'm an AI researcher with a business mindset. My research spans 3 pillars: Speech-Language Processing, Multimodal LLMs, and Medical AI. I'm leading a research group of 20 people to bring theoretical AI to real-world applications that serve business needs.

Education

University of Toronto — Toronto, Canada
Master of Applied Science in Biomedical Engineering, fully-funded program — *January 2024 – Leave of Absence*

- QS Rankings: #1 overall in Canada, #9 in AI globally
- Research area: Machine Learning for Multivariate Time-series
- Supervisor: **Prof. Shehroz Khan** (h-index 30)

RWTH Aachen University — Aachen, Germany
Bachelor Thesis in Computer Science — *December 2022*

- THE Rankings: #2 in Computer Science in Germany, #50 globally
- Thesis supervisor: **Prof. Hermann Ney** (h-index 113), **Prof. Ralf Schlüter** (h-index 50)
- Thesis title: Unsupervised Pre-Training for Vietnamese Automatic Speech Recognition in the HYKIST Project **[DOI]**
- Thesis grade: 1.0/6.0 (German grade), 100/100 (International percentage)

FH Aachen University of Applied Sciences — Jülich, Germany
Bachelor in Biomedical Engineering, taught-in-German program — *December 2022*

- WiWo Ranking: #1 in Engineering and Informatics among Universities of Applied Sciences in Germany
- Thesis supervisor: **Prof. Ilya Digel** (h-index 30)
- Overall grade: 2.2/6.0 (German grade), 80/100 (International percentage)

Vietnam National University Ho Chi Minh City — Ho Chi Minh City, Vietnam
Bachelor in International Economic Relations — *October 2016*

- QS Rankings: #1 overall in Vietnam, #701-750 globally
- Top 100 out of 354897 candidates (0.02%) with total scores of 27/30 in the Vietnamese National High School Graduation Examination 2015 in Mathematics, Physics and English
- Grade: 1st ranked - Valedictorian

Industry Experience

Knovel Engineering — Remote Singapore
AI Researcher — *November 2024 – Present*

- Founder of a research team comprising 30+ AI researchers
- Research projects: Commercializable Multimodal Large Language Models

FPT Software AI Center, FPT Corporation — Remote Vietnam
AI Research Intern — *March 2024 – October 2024*

- The largest Vietnamese IT company, top 50 AI company globally
- Founder/Leader of a research team comprising 20 AI residents, engineers and PhD students
- Deployed commercialized products: **Real-time Speech Summarization System**, **Sentiment Reasoning System**

Research Experience

University Health Network — Toronto, Canada
Graduate Research Assistant — *January 2024 – Present*

- #5 world's best hospital (Newsweek 2023), #1 world's rehab research facility
- Research project: Predicting Agitation in People Living with Dementia

Machine Learning and Human Language Technology Group, RWTH Aachen University — Aachen, Germany
Student Research Assistant — *May 2021 – December 2022*

- Research supervisor: **Prof. Hermann Ney** (h-index 113, 63000+ citations, the most cited researcher and the highest h-index in the world in Speech Recognition and in Machine Translation)
- Research co-supervisor: **Prof. Ralf Schlüter** (h-index 50, 12000+ citations)
- Research topic: Semi-Supervised Learning for Medical Domain Speech Recognition

Awards & Honors

Toronto Rehabilitation Institute Student Scholarship (OSOTF) 2024
University Health Network & University of Toronto (10000 CAD)

EPIC-AT Fellowship 2024
AGE-WELL & University of Toronto (17000 CAD)

SGS Research Travel Grant 2024
University of Toronto (950 CAD for LREC-COLING 2024 - the highest amount ever)

ORT Conference Participation Award 2024
University Health Network (500 CAD for LREC-COLING 2024)

Top 12 HackerRank in Germany 2020
HackerRank - the largest competitive programming platform in the world

Valedictorian Scholarship of Vietnam National University Ho Chi Minh City 2015
Vietnam National University Ho Chi Minh City

Other Experience

Mathnasium Toronto, Canada
Instructor - Part time *October 2023 – November 2023*

- Communicated with students in an understandable way about daily lessons
- Developed automated teaching tools and methods to help students learn mathematics

Techniker Krankenkasse Geilenkirchen, Germany
Volunteer - Full time *March 2016 – June 2016*

- The company is Germany's largest health insurance fund
- Maintained business contacts with 1000+ student customers, organized and executed 3 events to advertise company's insurance packages, and created marketing concepts
- Received certificate for contribution

FH Aachen University of Applied Sciences Geilenkirchen, Germany
Research Intern *January 2016 – March 2016*

- Research labs: Freshman Laboratory of Electrical Engineering, Laboratory of Molecular Medicine and Cell, Biophysics Lab, Chemistry Laboratory, and Freshman Biomedical Labor
- Received certificates for contribution

Publications

All publications are peer-reviewed/submitted at top-tier venues
(*) Equal contribution

Preprint

11. **Audio-3DVG: Unified Audio - Point Cloud Fusion for 3D Visual Grounding**
    Duc Cao-Dinh*, <u>Khai Le-Duc</u>*, Anh Dao, Bach Phan Tat, Chris Ngo, Duy M. H. Nguyen, Nguyen X. Khanh, Thanh Nguyen-Tang
    Preprint, 51 pages

10. **A Wearable Device Dataset for Mental Health Assessment Using Laser Doppler Flowmetry and Fluorescence Spectroscopy Sensors**
    Minh Ngoc Nguyen*, <u>Khai Le-Duc</u>*, Tan-Hanh Pham*, Trang Nguyen, Quang Minh Luu, Ba Kien Tran, Truong-Son Hy, Viktor Dremin, Sergei Sokolovsky, Edik Rafailov
    Preprint, 55 pages

9. **wav2graph: A Framework for Supervised Learning Knowledge Graph from Speech**
   <u>Khai Le-Duc</u>*, Quy Anh Dang*, Tan-Hanh Pham, Truong-Son Hy
   32 pages, 80+ stars, GitHub top trending repo

8. **LiteGPT: Large Vision-Language Model for Joint Chest X-ray Localization and Classification Task**
   <u>Khai Le-Duc</u>*, Ryan Zhang*, Ngoc Son Nguyen*, Tan-Hanh Pham, Anh Dao, Ba Hung Ngo, Anh Totti Nguyen, Truong-Son Hy
   Preprint, 19 pages

7. **MultiMed-ST: Large-scale Many-to-many Multilingual Medical Speech Translation** [Code]
   <u>Khai Le-Duc</u>*, Tuyen Tran*, Bach Phan Tat, Nguyen Kim Hai Bui, Quan Dang, Hung-Phong Tran, Thanh-Thuy Nguyen, Ly Nguyen, Tuan-Minh Phan, Thi Thu Phuong Tran, Chris Ngo, Nguyen X. Khanh, Thanh Nguyen-Tang
   EMNLP 2025 | 120 pages

6. **MultiMed: Multilingual Medical Speech Recognition via Attention Encoder Decoder** [Code]
   <u>Khai Le-Duc</u>, Phuc Phan, Tan-Hanh Pham, Bach Phan Tat, Minh-Huong Ngo, Chris Ngo, Thanh Nguyen-Tang, Truong-Son Hy
   ACL 2025 Industry Track

5. **Sentiment Reasoning for Healthcare** [Code]
   Khai-Nguyen Nguyen*, <u>Khai Le-Duc</u>*, Bach Phan Tat, Duy Le, Long Vo-Dang, Truong-Son Hy
   ACL 2025 Industry Track (Oral)

4. **Medical Spoken Named Entity Recognition** [Code]
   <u>Khai Le-Duc</u>, David Thulke, Hung-Phong Tran, Long Vo-Dang, Khai-Nguyen Nguyen, Truong-Son Hy, Ralf Schlüter
   NAACL 2025 Industry Track

3. **Real-time Speech Summarization for Medical Conversations** [Code]
   <u>Khai Le-Duc</u>*, Khai-Nguyen Nguyen*, Long Vo-Dang, Truong-Son Hy
   Interspeech 2024 (Oral)

2. **VietMed: A Dataset and Benchmark for Automatic Speech Recognition of Vietnamese in the Medical Domain** [Code]
   <u>Khai Le-Duc</u>
   LREC-COLING 2024 (Oral)

1. **Development of Hybrid ASR Systems for Low Resource Medical Domain Conversational Telephone Speech**
   Christoph Lüscher, Mohammad Zeineldeen, Zijian Yang, Peter Vieting, <u>Khai Le-Duc</u>, Weiyue Wang, Ralf Schlüter, Hermann Ney
   ITG Speech Communication 2023