

Le Tan Dang Khoa

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Current Employment

- Sep 2024–Now **Senior ML Engineer**, Visenze, Singapore.

Previous Employment

- Oct 2018–2023 **Research Software Engineer**, Visenze, Singapore.
- Mar 2016–2018 **Research Assistant**, Singapore University of Technology and Design, Singapore.
- May–Sep 2015 **Research Intern – Mitacs Program**, University of Saskatchewan, Saskatchewan, Canada.
- Feb–Apr 2014 **Research Intern**, Japan Advanced Institute of Science and Technology, Nomi, Japan.

Education

- 2023–Now **Master of Computing, Artificial Intelligence Specialisation**, National University of Singapore.
- 2011–2015 **Bachelor of Science in Information Technology, Honors Program**, Ho Chi Minh University of Science.

Projects

Visenze

- **MultiSearch:**
 - MultiSearch Backend Architecture: led an evaluation of state-of-the-art vector search engines, conducting comprehensive **survey** and benchmarks. Proposed a new architecture for the product search backend, which was selected as the company's next-generation search infrastructure.
 - Multimodality Search Enhancement: Improved search performance in various scenarios, including multilingual and exact match searches.
 - Advanced Search Experiences: Designed and implemented new search features: reranking, boosting, natural filtering, autocompletion, and adaptive thresholding.
 - Virtual Annotators: Developed virtual agents to streamline annotation tasks: translation, labeling, and query generation.
 - HNSW Algorithm Optimization: Conducted research and experiments to determine optimal settings for HNSW, and investigated consistency issues across multiple replicas.
- **Computer Vision:** successfully released multiple features and improvements for company products.
 - Object Detection: Responsible for developing the object detection component for all company products (search, tagging, recommendation). I revamped the annotation guidelines and processes, developed a new training codebase, released multiple detection models to production, and implemented new features for detection API.
 - Vector Search Optimization: conducted experiments on latest vector search algorithms, proposed and implemented new distance calculation, which reduced vector storage by 25% while maintaining the same recall quality, gained 2x search speedup.
 - Product Duplication Detection: Improved visual embedding models using advanced augmentation techniques and implemented new rerank logic to effectively identify duplicate products in customer catalogs.
- **Augmented Reality** Designed a data collection tool to capture objects in 3D and developed multiple on-device computer vision solutions for mobile devices, including virtual try-on, object tracking, and hand gesture recognition. Successfully integrated these into a globally popular AR mobile game.

National University of Singapore

- **HDB Rental Prices Prediction Competition:** Developed a regression model to predict rental prices in Singapore, achieving **top 1 ranking** on the private leaderboard.
- **Self-ordering Menu Recommender System:** Developed a deep reinforcement learning-based **recommendation system** trained on 11-month data from a F&B franchise in Singapore.
- **LightningCat:** a cloud-based SaaS platform that provides real-time updates on Singapore's sporting facilities, including operational status, capacity, weather-related closures, booking slots, through an intuitive map interface to optimize facility usage and foster community engagement.
- **TemporalLens:** an AI-driven pipeline tracking emerging topics, constructs event timelines & knowledge graphs, analyzes

sentiment shifts.

Singapore University of Technology and Design

- **Urban-Area Scene-Based Localization**
 - Implemented an on-device visual localization system on Android devices [1].
- **Integer Optimization on Deep Learning** Collaborated on methods for training hashing codes with deep learning models.
 - A new hashing method simultaneously learns image features and hash codes [2].
 - A new aggregating scheme for image hashing on hand-crafted features [3].
 - An end-to-end deep network for large-scale supervised [4] and unsupervised hashing [5].
 - DeepVQ - an end-to-end vector quantization model for long code lengths [6].
 - Aggregation schemes to improve convolutional features [7].

University of Saskatchewan

- **Lymphocytes counting:** Developed a new method utilizing color differentiation and object contour analysis.

HCM University of Science

- **Feature learning:** Proposed a compression method for PCA features and applied to the facial recognition problem [8].

Technical Skills

- **Programming Languages:** Python, Go, C++, Java, C#, Objective-C, Julia, MATLAB.
- **Technologies:** HuggingFace, OpenCV, Pandas, PyTorch, Unity, Mediapipe.
- **Languages**
 - Vietnamese: Native proficiency.
 - English: Professional working proficiency. Academic IELTS score: 7.5.

Awards

- 2015 **Mitacs**, *Globalink Scholarship*, Canada.
- 2014 **Bank of Tokyo**, *Mitsubishi UFJ Scholarship*, Vietnam.
- 2014 **Sunflower Mission**, *Engineering and Technology Scholarship*, Vietnam.
- 2014 **IEEE**, *IEEE Student Travel Grant*, USA.
- 2014 **The National Foundation for Science and Technology Development**, *Research grant*, Vietnam.
- 2014 **Japan Student Services Organization**, *JASSO ASEAN scholarship*, Japan.

Selected Publications

- [1] N.-T. Tran, D.-K. Le Tan, A.-D. Doan, T.-T. Do, T.-A. Bui, M. Tan, and N.-M. Cheung, "On-device scalable image-based localization via prioritized cascade search and fast one-many ransac," *IEEE Transactions on Image Processing*, vol. 28, no. 4, pp. 1675–1690, 2019.
- [2] T.-T. Do, D.-K. Le Tan, T. T. Pham, and N.-M. Cheung, "Simultaneous feature aggregating and hashing for large-scale image search," in *CVPR*, July 2017.
- [3] T. Hoang, T.-T. Do, D.-K. L. Tan, and N.-M. Cheung, "Enhance feature discrimination for unsupervised hashing," *ICIP*, 2017.
- [4] D.-K. Le Tan, T.-T. Do, and N.-M. Cheung, "Supervised hashing with end-to-end binary deep neural network," in *ICIP*, IEEE, 2018.
- [5] T.-T. Do, T. Hoang, D.-K. Le Tan, T. Pham, H. Le, N.-M. Cheung, and I. Reid, "Binary constrained deep hashing network for image retrieval without manual annotation," in *2019 IEEE Winter Conference on Applications of Computer Vision (WACV)*, pp. 695–704, IEEE, 2019.
- [6] D.-K. Le Tan, L. Huu, T. Hoang, T.-T. Do, and N.-M. Cheung, "Deepvq: A deep network architecture for vector quantization," in *CVPR Workshop on Learned Image Compression*, IEEE, 2018.
- [7] T. Hoang, T.-T. Do, D.-K. L. Tan, and N.-M. Cheung, "Selective deep convolutional features for image retrieval," *ACM Multimedia*, 2017.
- [8] D.-K. T. Le, H. P. Truong, and T. H. Le, "Facial expression recognition using statistical subspace," in *ICIP*, pp. 5981–5985, IEEE, 2014.