

# Le Tan Dang Khoa

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## Previous Employment

- Sep 2024–Now **Senior ML Engineer**, *Visenze*, Singapore.
- 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 across various scenarios, including multilingual and exact match searches.
  - Advanced Search Experience Development: Designed and implemented new search features, including reranking, boosting, natural filtering, and adaptive thresholding.
  - Virtual Annotators: Developed virtual agents to streamline annotation tasks such as 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.

### 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

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

#### HCM University of Science

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

## Technical Skills

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

## Awards

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