Dat Ngo, Ph.D.

Email : datngokt@dau.ac.kr
http://www.datngokt.com/
Tel. : +82-51-200-6967

RESEARCH INTERESTS

- **Machine learning/Deep learning**: unsupervised/unpaired learning, disentangled learning, deep unfolding, knowledge distillation, real-time and energy-efficient implementations of Deep Neural Networks

- **Digital image/video processing**: image enhancement/restoration algorithms for smart mobility and smart cities, high dynamic range expansion, tone mapping, salient object detection, application-specific high-level feature representation

- **SoC/VLSI architectures for real-time image/video processing**: real-time implementations of computationally intensive algorithms, compact and fast architectures for image/video processing filters

EXPERIENCE

- **Algorithm Design**

  - Conceptualization
  - Literature review
  - Data collection and analysis
  - Algorithmic complexity analysis
  - Optimization

- **Hardware/Software Co-Design**

  - Hardware/software workload partition
  - Hardware accelerator design
  - Bare-metal programming

- **Windows GUI Application Development**

  - Verification platforms for audio/video processing algorithms
  - Accustomed to MFC framework
  - Accustomed to OpenCV, FFmpeg, and DirectShow libraries

- **Embedded Linux System Development**

  - Video processing pipeline implementation
  - Firmware development (accustomed to Video4Linux framework)
  - GUI application development (accustomed to GStreamer framework)
  - Custom Linux-based system development

- **Heterogeneous Computing**

  - Workload distribution among CPUs, GPUs, and FPGAs
  - Accustomed to OpenAMP

Korean Patents

- **Method for Estimating Haze Density Using Haziness Degree Evaluator**
  Inventors: *Bongsoon Kang, Gi-Dong Lee, **Dat Ngo**, Seungmin Lee, Uijin Kang, Daeun Kim*
  Registration Number: *10-2439149*
  Registration Date: *2022.08.29*

- **Method and Apparatus for Autonomous Image Dehazing Using Single-Scale Image Fusion**
  Inventors: *Bongsoon Kang, Gi-Dong Lee, Seungmin Lee, **Dat Ngo**, Quoc-Hieu Nguyen, Tri Minh Ngo, Hwibo Shim*
  Registration Number: *10-2439145*
  Registration Date: *2022.08.29*

- **Method and Apparatus for Image Dehazing Using Single-Scale Image Fusion**
  Inventors: *Bongsoon Kang, **Dat Ngo**, Seungmin Lee, Quoc-Hieu Nguyen, Uijin Kang*
  Registration Number: *10-2261532*
  Registration Date: *2021.06.01*

- **Optimized Hardware Architecture for Modified Hybrid Median Filter**
  Inventors: *Bongsoon Kang, Gi-Dong Lee, **Dat Ngo**, Juhee Lee*
  Registration Number: *10-2214669*
  Registration Date: *2021.02.04*

- **Method and Apparatus for Atmospheric Light Estimation for Reducing Computational Cost of Single Image Haze Removal**
  Inventors: *Bongsoon Kang, Seungmin Lee, **Dat Ngo**, Hankyeol Kim*
  Registration Number: *10-2149974*
  Registration Date: *2020.08.25*

- **Edge-Preserving Median Filter Implementation Based on Batcher Parallel Sorting Network**
  Inventors: *Bongsoon Kang, **Dat Ngo**, Hee-Kyung Kim, Seungmin Lee*
  Registration Number: *10-2039653*
  Registration Date: *2019.10.28*

- **Method for Removing Haze From a Single Image**
  Inventors: *Bongsoon Kang, Gi-Dong Lee, Geun-Jun Kim, Seungmin Lee, **Dat Ngo***
  Registration Number: *10-1997866*
  Registration Date: *2019.07.02*

Participated Projects

- **Development of Tandem Low-Voltage (V Layer 0.25V) nCGL Using Artificial Intelligence**
  Funding Body: *Korean Ministry of Trade, Industry and Energy*
  Project Period: *2021.04.01 - 2024.12.31*

- **Research of the Low-Light Image Enhancement Algorithm and Hardware Implementation Using Dual Camera**
  Funding Body: *Korean Ministry of Education*
  Project Period: *2015.11.01 - 2020.08.31*

- **BK21 Plus Next Generation Smart Electronics Core Technology Team**
  Funding Body: *Korean Ministry of Education*
  Project Period: *2013.09.01 - 2020.08.31*

- **Development of IoT Solutions for Daily Use**
  Funding Body: *Media Device Center, Dong-A University, Korea*
  Project Period: *2016.09.01 - 2017.08.31*

- **Journals**

  - **Ngo, D.**; Lee, G.-D.; Kang, B. "Singe Image Dehazing With Unsharp Masking and Color Gamut Expansion," *IEEE Access* **2022**, 10, 102462–102474. [Paper]

  - Lee, S.; **Ngo, D.**; Kang, B. "Design of an FPGA-Based High-Quality Real-Time Autonomous Dehazing System," *Remote Sens.* **2022**, 14, 1852. [Paper]

  - **Ngo, D.**; Lee, S.; Kang, U.-J.; Ngo, T.M.; Lee, G.-D.; Kang, B. "Adapting a Dehazing System to Haze Conditions by Piece-Wisely Linearizing a Depth Estimator," *Sensors* **2022**, 22, 1957. [Paper]

  - **Ngo, D.**; Lee, S.; Lee, G.-D.; Kang, B. "Automating a Dehazing System by Self-Calibrating on Haze Conditions," *Sensors* **2021**, 21, 6373. [Paper]

  - **Ngo, D.**; Kang, B. "Taylor-Series-Based Reconfigurability of Gamma Correction in Hardware Designs," *Electronics* **2021**, 10, 1959. [Paper]

  - **Ngo, D.**; Lee, G.-D.; Kang, B. "Haziness Degree Evaluator: A Knowledge-Driven Approach for Haze Density Estimation," *Sensors* **2021**, 21, 3896. [Paper][GitHub]

  - **Ngo, D.**; Lee, S.; Ngo, T.M.; Lee, G.-D.; Kang, B. "Visibility Restoration: A Systematic Review and Meta-Analysis," *Sensors* **2021**, 21, 2625. [Paper]

  - **Ngo, D.**; Lee, S.; Lee, G.-D.; Kang, B. "Single-Image Visibility Restoration: A Machine Learning Approach and Its 4K-Capable Hardware Accelerator," *Sensors* **2020**, 20, 5795. [Paper][GitHub]

  - **Ngo, D.**; Lee, S.; Nguyen, Q.-H.; Ngo, T.M.; Lee, G.-D.; Kang, B. "Single Image Haze Removal from Image Enhancement Perspective for Real-Time Vision-Based Systems," *Sensors* **2020**, 20, 5170. [Paper][GitHub]

  - **Ngo, D.**; Lee, S.; Kang, B. "Robust Single-Image Haze Removal Using Optimal Transmission Map and Adaptive Atmospheric Light," *Remote Sens.* **2020**, 12, 2233. [Paper][GitHub]

  - **Ngo, D.**; Lee, S.; Kang, B. "Hardware Design of Patch-based Airlight Estimation Algorithm," *j.inst.Korean.electr.electron.eng.*, Vol. 24, No.2, pp.497-501, Jun. **2020**. [Paper]

  - Lee, S.; **Ngo, D.**; Kang, B. "Nonlinear model for estimating depth map of haze removal," *j.inst.Korean.electr.electron.eng.*, Vol. 24, No.2, pp.492-496, Jun. **2020**. [Paper]

  - **Ngo, D.**; Lee, G.-D.; Kang, B. "Improved Color Attenuation Prior for Single-Image Haze Removal," *Appl. Sci.* **2019**, 9, 4011. [Paper][GitHub]

  - **Ngo, D.**; Lee, G.-D.; Kang, B. "A 4K-Capable FPGA Implementation of Single Image Haze Removal Using Hazy Particle Maps," *Appl. Sci.* **2019**, 9, 3443. [Paper]

  - **Ngo, D.**; Kang, B. "Improving Performance of Machine Learning-based Haze Removal Algorithms with Enhanced Training Database," *j.inst.Korean.electr.electron.eng.*, Vol.22, No.4, pp.948-952, Dec. **2018**. [Paper][GitHub]

  - **Ngo, D.**; Kang, B. "Preprocessing for High Quality Real-time Imaging Systems by Low-Light Stretch Algorithm," *j.inst.Korean.electr.electron.eng.*, Vol.22, No.3, pp.585-589, Sep. **2018**. [Paper]

- **Conferences**

  - **Ngo, D.**; Lee, S.; Kang, B. "Nonlinear Unsharp Masking Algorithm," *2020 International Conference on Electronics, Information, and Communication (ICEIC)*, Barcelona, Spain, **2020**, pp.1-6. [Paper][Poster][GitHub]

  - **Ngo, D.**; Kang, B. "Image Detail Enhancement via Constant-Time Unsharp Masking," *2019 IEEE 21st Electronics Packaging Technology Conference (EPTC)*, Singapore, Singapore, **2019**, pp.743-746. [Paper][Poster][Code]

  - **Ngo, D.**; Kang, B. "A New Data Preparation Methodology in Machine Learning-based Haze Removal Algorithms," *2019 International Conference on Electronics, Information, and Communication (ICEIC)*, Auckland, New Zealand, **2019**, pp.1-4. [Paper][Poster][GitHub]

- ○ **Ngo, D.**; Lee, S.; Kang, B. "Light Stretch Algorithm for Image Quality Enhancement," *The 4th International Conference on Virtual Reality ICVR 2018*, Hong Kong, Hong Kong, **2018**, pp.56-60. [Paper][Slides]

- ○ **Ngo, D.**; Nguyen, Q.-H.; Kang, B. "C/C++ Precision Analysis Utility for Fixed-Point Design," *2019 SoC Conference*, Daejeon, Korea, **2019**. [Paper][Poster][Code]

- ○ **Ngo, D.**; Kang, B. "Hardware Implementation of Low-Light Stretch Algorithm," *2018 SoC Conference*, Seoul, Korea, **2018**. [Paper][Slides]

- ○ **Ngo, D.**; Lee, S.; Lee, G.; Kang, B. "Hardware Implementation of 2-D Cumulative Histogram based Median Filter," *Conference on Electronic and Communication*, Busan, Korea, **2017**, pp.80-82. [Paper][Slides]

- ○ **Ngo, D.**; Kang, B. "Fast Single Image Dehazing Algorithm for Real-time Applications," *2017 SoC Conference*, Seoul, Korea, **2017**, pp.131-132. [Paper][Poster]

EDUCATION AND ACHIEVEMENTS

- **Industry-Academic Cooperation Center, Dong-A University**   Busan, Korea
  Postdoctoral Researcher   *Mar. 2022 - Present*

- **Dong-A University**   Busan, Korea
  Ph.D. in Electronics Engineering   *Sep. 2018 - Feb. 2022*

  - ○ Excellent Paper Award From the President of the Graduate School of Dong-A University

- **Dong-A University**   Busan, Korea
  M.Sc.Eng. in Electronics Engineering   *Sep. 2016 - Aug. 2018*

  - ○ Excellent Paper Award From the Institute of Electronics and Information Engineers (IEIE)

- **Danang University of Science and Technology**   Danang, Vietnam
  B.Eng. in Computer Engineering   *Sep. 2011 - July 2016*

  - ○ Valedictorian in the Department of Electronic and Telecommunication Engineering
  - ○ Sunflower Mission Engineering and Technology Scholarships (2013 and 2015)

- **Le Quy Don High School for the Gifted**   Danang, Vietnam
  High School Diploma   *Sep. 2008 - July 2011*

  - ○ Second Prize in the National Excellent Pupil Contest in Physics
  - ○ Gold Medal in the Olympic 30/4 in Physics

INVITED TALK

- **IMAGIS**   Aug. 22nd, 2019
  3F-301, R&DB Center, 105, Gwanggyo-ro, Yeongtong-Gu, Suwon-City, Korea

  - ○ Deep Neural Network Tutorial

OTHERS

- **Review Activities**

  - ○ Information Fusion
  - ○ Remote Sensing
  - ○ Sensors
  - ○ Journal of Atmospheric and Oceanic Technology

- **Languages**
  - Vietnamese: *Mother Tongue*
  - Korean: *TOPIK Level 6 (230/300) – Valid until Aug. 2023*
  - English: *Toefl iBT 86/120 – Expired in May 2018*

- **Programming Languages**
  - Interpreted Languages: *MATLAB, Python*
  - Compiled Languages: *C/C++, Haskell*

- **Hardware Description Language**
  - Verilog

- **Typing Speed**
  - Korean: *328 characters/minute*
  - English: *408 characters/minute*

REFERENCES

- **Prof. Dr. Bongsoon Kang** (M.Sc.Eng. and Ph.D. Supervisor, DAU)
  Department of Electronics Engineering, Dong-A University
  Phone: +82-51-200-7703
  Email: bongsoon@dau.ac.kr

- **Prof. Dr. Gi-Dong Lee** (Ph.D. Co-Supervisor, DAU)
  Department of Electronics Engineering, Dong-A University
  Phone: +82-51-200-7704
  Email: gdlee@dau.ac.kr

- **Dr. Tri Minh Ngo**
  Dean, Faculty of Electronics and Telecommunication Engineering, The University of Danang–University of Science and Technology
  Email: nmtri@dut.udn.vn