NGUYEN PHUOC NGUYEN

Artificial intelligence - Computer vision/graphics - Image processing

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CAREER OBJECTIVES

Developing AI-based applications for computer vision/graphics, image analysis, and optimizing manufacturing systems.

EDUCATION

- **PhD in Computer Science (2023)** (focusing on AI/Machine Learning guided Computer Vision and Image Analysis, University of Missouri – Columbia (GPA: 3.87/4)
- **Master of Science in Industrial Engineering** - University of Missouri - Columbia (GPA: 3.96/4)
  Thesis: Text mining for big data with neural network and Hadoop
- **Bachelor of Science in Industrial Engineering** – Ho Chi Minh University of Technology (VN National University) (GPA: 7/10) Thesis: Solving vehicle routing and scheduling problem for Saigon Beer

SKILLS

- Computer vision / Image processing / Computer graphics: Python, C++, C# (OpenCV, Cognex), Matlab
- 3D Reconstruction & Electron microscopy image analysis: RELION - CryoSparc, Amira/Avizo – MIB
- Deep learning tools: PyTorch, Tensorflow, Matlab
- MLOps: using Docker container and Kubernetes, Continuous Integration/Delivery, Deployment on Azure
- Embedded machine learning: OpenVINO, Raspberry Pi
- Software development: Visual C# (WindowsForm, WPF, Asp.net), SQL Server, Excel VBA macro
- Generative AI: finetuning large language models (LLM), stable diffusion models
- Optimization: GAMS-Cplex, Lingo, Gurobi, Matlab; Simulation: Arena; CAD/CAM/CNC: SolidWorks, MasterCAM

CERTIFICATES

- OpenCV Python 1, 2 OpenCV C++ 1, 2 CUDA C++, Python
- Deep Learning PyTorch, Tensorflow Sensor Fusion, Multi Object Tracking
- Azure Fundamentals
- Green belt six-sigma

INDUSTRY EXPERIENCE

Machine Vision Engineer (Applied Optoelectronics, Inc., Houston TX) Aug 2023 – Present

- Developing deep learning models and application for visual inspection of semiconductor wafer chips using:
  - Open-source framework (OpenCV, PyTorch, Qt for unsupervised learning approach)
  - Cognex framework and Visual C# (for supervised learning approach) (improved accuracy from 94% to 98+%)
  - SQL Server database
  - Automating report generation using SAP Crystal report

Postdoctoral Appointee - Machine Learning for Computational X-Ray Science (received offer from Argonne National Laboratory, Lemont, IL) **July 2023**

Computer Science Co-op (Bayer Crop Science, USA) **Jan 2023 – June 2023**
Analyzing manufacturing data, participating in a simulation project (virtual factory) for business decision support system

Senior Professional I (received offer from Samsung Display, Vietnam) **July 2022**

- Addressing software and hardware issues for machine vision, improving vision programs
- Analyzing and developing new vision software (for manufacturing systems of display products)

Medical Imaging Research Intern (Siemens Healthineers, Princeton, NJ, USA) **Jun 2020 – Aug 2020**
Developing deep learning models for analysis of 3D brain CT images. Our work received a patent in 2022

Manufacturing Engineer (received offer from Clinical Innovations in Salt Lake City, UT, USA) **Aug 2015**
Optimizing the workflow, facility layout, equipment efficiency, workforce utilization in a plant producing medical devices

GITHUB https://github.com/nguyen14ck?tab=repositories&q=&type=public&language=&sort=

ACADEMIC EXPERIENCE

Research Assistant (University of Missouri - Electron Microscopy Core Facility) **May 2017 – Dec 2022**

- Developing deep learning models for object detection & segmentation, denoising and reconstructing images
  - Object detection and classification: 2D macro molecules (DRPnet), 3D sub-tomograms
  - Semantic segmentation, instance segmentation of cells (mitochondria, axon), viruses, carbon nanotubes…
  - Denoising tomography volumes
- Using Matlab – Amira to segment and analyze electron microscopy images for biomedical research
  - FIB-SEM images: 2D slices, 3D volumes
  - Quantifying objects based on intensity, textures, sizes & shapes…
- 3D reconstruction of macro molecules: using RELION, CryoSparc, and Reinforcement learning
- Writing scripts to submit jobs on high-performance computer cluster (with GPU)

Research Assistant (University of Missouri - Research Computing Center) **Sep 2016 – May 2017**

- Analyzing operation data of users on cluster (Slurm)
- Installing and testing software on cluster (CentOS 7)
- Using deep learning to analyze building energy consumption from big data (with Spark, DesingBuilder and Energy+)

Teaching Assistant, University of Missouri, Columbia **Spring 2014 – Spring 2016**

Courses: Engineering Statistics (with R), Manufacturing & Supply Chain Management , Information System, Advanced CAD/CAM

AWARD Outstanding PhD Student - Dept. of Electrical Engineering and Computer Science, University of Missouri (2023)

PATENT

Nguyen, N. P., Yoo, Y., Chekkoury, A., Pascal, C., Gibson, E. *Automated Estimation Of Midline Shift In Brain CT Images.* US Patent App. 17/303,932 filed by Siemens Medical Solutions USA, Inc in June 2021, approved in Mar 2022

GOOGLE SCHOLAR PROFILE link

SELECTED PUBLICATIONS

1. **Nguyen, N. P.,** Ersoy, I., Gotberg, J., Bunyak, F., & White, T. A. (2021). *DRPnet: automated particle picking in cryo-electron micrographs using deep regression*. BMC Bioinformatics, 22(1), 55–28. doi: 10.1186/s12859-020-03948-x https://doi.org/10.1186/s12859-020-03948-x
2. Gubins, Ilja and Chaillet, Marten L. and Schot, Gijs van der and Trueba, M. Cristina and Veltkamp, Remco C. and Forster, Friedrich and Wang, Xiao and Kihara, Daisuke and Moebel, Emmanuel and **Nguyen, Nguyen P.** and White, Tommi and Bunyak, Filiz et al. (2021). *SHREC 2021: Classification in Cryo-electron Tomograms*. The Eurographics Association. https://diglib.eg.org/handle/10.2312/3dor20211307
3. **Nguyen, N.P.**, Yoo, Y., Chekkoury, A., Eibenberger, E., Re, T.J., Das, J., Balachandran, A., Lui, Y.W., Sanelli, P.C., Schroeppel, T.J., Bodanapally, U.K., Nicolaou, S., White, T.A., Bunyak, F., Comaniciu, D., & Gibson, E. (2021). Brain midline shift detection and quantification by a cascaded deep network pipeline on non-contrast computed tomography scans. 2021 IEEE/CVF International Conference on Computer Vision (ICCV) Workshops, 487-495.
4. **Nguyen, N. P**., White, T., & Bunyak, F. (2021) *Mitochondria Instance Segmentation in Electron Microscopy Image Volumes using 3D Deep Learning Networks*. IEEE/Applied Imagery Pattern Recognition (AIPR) Workshop.
5. Alarcon, Mauro L., Wang, Songjie, **Nguyen, N. P.,** Pandey, Ashish, Bunyak, Filiz, Maschmann, Matthew, … Calyam, Prasad. (2022). *AI-Based Analytics and Remote Instrumentation Science Gateway*. Proceedings of the eScience Conference.
6. **Nguyen, N. P.,** Surya, Ramakrishna, Maschmann, Matthew, Calyam, Prasad, Palaniappan, Kannappan, Bunyak, Filiz. (2022). *Dual Loss Self-supervised Network for Segmentation of Carbon Nanotubes in SEM Imagery*. Proceedings of the European Conference on Computer Vision (ECCV) Workshops.
7. **Nguyen, N. P**., Lopez, S., Smith, C. L., Lever, T. E., Nichols, N. L., & Bunyak, F. (2022) *Axon and Myelin Sheath Segmentation in Electron Microscopy Images using Meta Learning*. IEEE/Applied Imagery Pattern Recognition (AIPR) Workshop.
8. **Nguyen, N. P.,** Surya, Ramakrishna, Calyam, Prasad, Palaniappan, Kannappan, Maschmann, Matthew, Bunyak, Filiz. (2023). *CNT-NeRF: Carbon Nanotube Forest Depth Layer Decomposition in SEM Imagery using Generative Adversarial Networks*. Proceedings of the Computer Vision and Pattern Recognition (CVPR) Workshops.

REVIEWS

- PLOS ONE journal
- COMPUTER METHODS AND PROGRAMS IN BIOMEDICINE journal
- ACM Computing Surveys journal
- IEEE International Conference on Bioinformatics and Biomedicine Workshop (BIBM) 2021
- International Conference of Pattern Recognition (ICPR) 2020, 2022