NGUYEN VAN THIEU

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SUMMARY

I am a PhD student at the University of Luxembourg, where my work centers on decentralized and federated learning, federated unlearning, and distributed optimization under communication-constrained IoT and wireless networks. My research focuses on gradient tracking, robust optimization, learning and unlearning over unreliable and heterogeneous systems, with applications to edge intelligence and digital twin–enabled systems.

I am also an active open-source research software developer and the author/maintainer of a large ecosystem of Python libraries for metaheuristic optimization, machine learning evaluation, feature selection, and neural models, adopted by a broad international user community. My work bridges theoretical optimization, system-level learning algorithms, and reproducible, scalable research software.

EDUCATION

PhD in Computer Science   08/2025 - Present

University of Luxembourg, Luxembourg
Interdisciplinary Centre for Security, Reliability and Trust (SnT)

- **Supervisor**: Dr. Vu Nguyen HA
- **Mentors**: Dr. Ti Ti Nguyen, and Dr. Ons Aouedi
- **Research Topic**:

    – Centralized and decentralized optimization

    – Gradient tracking, robustness, and adaptive optimization

    – Communication-efficient learning under IoT and wireless constraints

    – Federated learning and federated unlearning

    – Verifiable federated unlearning.

Master in Computer Science   10/2018 - 04/2021

Hanoi University of Science and Technology (HUST), Vietnam
School of Information and Communication Technology

- **GPA**: 3.72/4 (convertible to 10-scale: 9.00)
- **Thesis**: Time series analysis for forecasting problem
- **Short abstract**: Cloud computing offers numerous benefits for organizations and users by providing flexible resource allocation and cost optimization. This thesis introduces IAEO-SSNN, a time series forecasting model that combines a self-structured neural network (SSNN) with an improved version of the Artificial Ecosystem Optimization (IAEO) algorithm. We also propose an automated resource scaling system for cloud computing environments based on this predictive model. Experimental tests conducted on a Google cluster traces dataset demonstrate the superior performance of our proposed model compared to others in various scenarios.

Bachelor of Information Technology   08/2013 - 08/2018

Hanoi University of Science and Technology (HUST), Vietnam
School of Information and Communication Technology

- **Program**: ICT Talented Engineer
- **GPA**: 3.03/4 (convertible to 10-scale: 7.75)
- **Thesis**: Building a self-organizing neural network to predict future consumption of cloud resources

TEACHING

Lecturer, Faculty of Computer Science, Phenikaa University, Vietnam   01/2022 – 08/2025

- Courses Taught (Undergraduate Level):

    – Programming for Artificial Intelligence (CSE702028)

    – Data Analysis with Python (CSE702031)

- – Introduction to Data Science and Artificial Intelligence (CSE702003)

- – Data Visualization (CSE702060)

- – Introduction to Database (CSE703008)
- Other activities:

  - – Delivered lectures, tutorials, and practical programming sessions.

  - – Designed course materials, assignments, and project-based assessments.

  - – Supervised student research projects and theses.

RESEARCH

Researcher (Co-founder), Artificial Intelligence Independent Research Group, Vietnam   03/2020 – 07/2025

- Co-founded and co-led an independent research group; initiated collaborations and mentored junior members in research and software engineering practices.
- **Collaborative Applied AI:** Contributing optimization expertise to multi-disciplinary projects, including UAV path planning, WSN optimization, energy-efficient cloud management, optimization in geology and mining, and environmental modeling (groundwater, streamflow prediction).
- **Independent Research:** I am the author and maintainer of a large ecosystem of open-source Python libraries for optimization and machine learning research, widely used by the international research community (cumulative downloads exceeding **1 million downloads**). Some selected libraries:

  - – Mealpy: World's largest Python library for latest population-based metaheuristic optimization. Implements 200+ nature-inspired, bio-inspired, derivative-free, gradient-free, and black-box optimization algorithms.

  - – Opfunu: Largest Python library of numerical optimization benchmark functions. Includes all CEC competition benchmark functions (2005–2022) and 300+ classical benchmark problems.

  - – Mafese: Largest open-source framework for feature selection using metaheuristics, supporting filter-, wrapper-, embedded-, and unsupervised-based methods.

  - – PerMetrics: Comprehensive machine learning performance metrics library. Provides 111 metrics for regression, classification, and clustering problems.

  - – IntelELM: Comprehensive framework for Metaheuristic-based Extreme Learning Machines. Supports 400+ optimization-based models for classification and regression, fully integrated with the Scikit-Learn ecosystem.

  - – Additional libraries include: MetaPerceptron, EvoRBF, GrafoRVFL, Reflame, deforce, X-ANFIS, and pfevaluator.

Research Assistant, Hanoi University of Science and Technology (HUST), Vietnam   08/2017 - 12/2021

- **Lab**: High Performance Computing Center (HPCC)
- **Supervisor**: Assoc. Prof. Nguyen Binh Minh
- **Topic**: AI, ML, DL, Optimization (Metaheuristic Algorithms), and Its Application in Cloud Resource Management
- **Research works**:

  - – Applied machine learning and deep learning to forecast time-series data (Worldcup 1998 requests, Google cluster trace).

  - – Designed an improved time-series forecasting model based on neural networks (self-structuring neural networks, functional link neural networks, ELM, MLP, self-organized network inspired by immune algorithm (SONIA), etc.) and computational intelligence techniques (swarm optimization, human-inspired optimization, etc.).

  - – Designed an auto-scaling system that optimizes energy consumption in cloud servers by turning servers off or on as needed.

Research Assistant, National Institute of Informatics (NII), Japan   03/2020 - 09/2020

- **Lab**: Fukuda Laboratory

- **Supervisor**: Prof. Kensuke Fukuda
- **Topic**: Estimating system log templates using deep transfer learning.
- **Research works**:
  - Worked on data-driven methods such as abstracting execution logs (AEL - heuristics), Drain (parsing tree), CRF (NLP), and Nulog (neural network).
  - Designed a deep transfer learning model (DTNN - NLP) based on an extension of CRF that incorporates semantic information at the word and character level in NLP, and uses transfer learning based on deep neural networks (LSTM and GRU).

Research Assistant, University of Luxembourg, Luxembourg 09/2019 - 02/2020

- **Lab**: Parallel Computing and Optimization Group (PCOG)
- **Supervisor**: Dr. Daniel H. Stolfi
- **Topic**: Meta-heuristics and its application in path planning
- **Research works**:
  - Applied bio-inspired and meta-heuristic algorithms to solve combinatorial optimization problems, as well as problems in robotics and computer simulations.
  - Optimized the path planning of a swarm of UAVs using the CoppeliaSim simulator.

PUBLICATIONS

A. Journals:

1. **Van Thieu, N.**, Hoang, N. T., & Faris, H. (2025). GrafoRVFL: A gradient-free optimization framework for boosting random vector functional link network. Neurocomputing, 130898.

2. Ahmed, A. N., **Van Thieu, N.**, Chong, K. L., Huang, Y. F., & El-Shafie, A. (2025). A Comparative Analysis of Machine Learning Models for Simulating, Classifying, and Assessment River Inflow. Water Resources Management, 1-19.

3. **Van Thieu, N.**, Mirjalili, S., Garg, H., & Hoang, N. T. (2025). MetaPerceptron: A standardized framework for metaheuristic-driven multi-layer perceptron optimization. Computer Standards & Interfaces, 93, 103977.

4. Nguyen, H., & **Van Thieu, N.** (2025). Measurement and prediction of blast-induced flyrock distance using unmanned aerial vehicles and metaheuristic-optimized ANFIS neural networks. Natural Resources Research, 34(2), 1169-1198.

5. **Van Thieu, N.**, Houssein, E. H., Oliva, D., & Hung, N. D. (2025). IntelELM: A python framework for intelligent metaheuristic-based extreme learning machine. Neurocomputing, 618, 129062.

6. Oyelade, Olaide N., Absalom E. Ezugwu, Apu K. Saha, **Nguyen V. Thieu**, and Amir H. Gandomi. "Deep learning at the service of metaheuristics for solving numerical optimization problems." Neural Computing and Applications (2025): 1-36.

7. Nguyen, Ngoc Hung, Van-Dinh Nguyen, Anh Tuan Nguyen, **Nguyen Van Thieu**, Hoang Nam Nguyen, and Symeon Chatzinotas. "Deadline-aware joint task scheduling and offloading in mobile-edge computing systems." IEEE Internet of Things Journal 11, no. 20 (2024): 33282-33295.

8. **Van Thieu, N.**, Nguyen, N. H., & Heidari, A. A. (2024). Feature selection using metaheuristics made easy: Open source MAFESE library in Python. Future Generation Computer Systems, 160, 340-358.

9. **Van Thieu, N.**, Nguyen, H., Garg, H., & Sirbiladze, G. (2024). deforce: Derivative-free algorithms for optimizing Cascade Forward Neural Networks. Software Impacts, 21, 100675.

10. Nguyen, Binh Minh, **Thieu Nguyen**, Quoc-Hien Vu, Tran Huy Hung, Tran Hoang Hai, Huynh Thi Thanh Binh, and Van-Dang Tran. "Dholes Hunting—A Multi-Local Search Algorithm Using Gradient Approximation and Its Application for Blockchain Consensus Problem." IEEE Access 12 (2024): 93333-93349.

11. **Van Thieu, N.**, Nguyen, N. H., Sherif, M., El-Shafie, A., & Ahmed, A. N. (2024). Integrated metaheuristic algorithms with extreme learning machine models for river streamflow prediction. Scientific reports, 14(1), 13597.

12. **Van Thieu, N.** (2024). Opfunu: an open-source python library for optimization benchmark functions. Journal of Open Research Software, 12(1).

13. Zhao, L., Wilson, S. B., **Van Thieu, N.**, Zhou, J., Romulus, C., & Tran, T. T. (2024). A new intelligence model for evaluating clay compressibility in soft ground improvement: a combined approach of bees optimization and extreme learning machine. Acta Geophysica, 72(2), 579-595.

14. **Van Thieu, N.** (2024). Permetrics: A framework of performance metrics for machine learning models. Journal of Open Source Software, 9(95), 6143.

15. Nguyen, H., Choi, Y., Monjezi, M., **Van Thieu, N.**, & Tran, T. T. (2024). Predicting different components of blast-induced ground vibration using earthworm optimisation-based adaptive neuro-fuzzy inference system. International Journal of Mining, Reclamation and Environment, 38(2), 99-126.

16. **Van Thieu, Nguyen**, Diego Oliva, and Marco Pérez-Cisneros. "MetaCluster: An open-source Python library for metaheuristic-based clustering problems." SoftwareX 24 (2023): 101597.

17. Nguyen, Binh Minh, **Thieu Nguyen**, Quoc-Hien Vu, Huy Hung Tran, Hiep Vo, Do Bao Son, Huynh Thi Thanh Binh, Shui Yu, and Zongda Wu. "A novel nature-inspired algorithm for optimal task scheduling in fog–cloud blockchain System." IEEE Internet of Things Journal 11, no. 2 (2023): 2043-2057.

18. **Van Thieu, N.**, & Mirjalili, S. (2023). MEALPY: An open-source library for latest meta-heuristic algorithms in Python. Journal of Systems Architecture, 139, 102871.

19. **Van Thieu, N.**, Barma, S. D., Van Lam, T., Kisi, O., & Mahesha, A. (2023). Groundwater level modeling using augmented artificial ecosystem optimization. Journal of Hydrology, 617, 129034.

20. Nguyen, B. M., Tran, T., **Nguyen, T.**, & Nguyen, G. (2022). An improved sea lion optimization for workload elasticity prediction with neural networks. International Journal of Computational Intelligence Systems, 15(1), 90.

21. Xie, C., Nguyen, H., Bui, X. N., **Nguyen, V. T.**, & Zhou, J. (2021). Predicting roof displacement of roadways in underground coal mines using adaptive neuro-fuzzy inference system optimized by various physics-based optimization algorithms. Journal of Rock Mechanics and Geotechnical Engineering, 13(6), 1452-1465.

22. Ahmed, A. N., Van Lam, T., Hung, N. D., **Van Thieu, N.**, Kisi, O., & El-Shafie, A. (2021). A comprehensive comparison of recent developed meta-heuristic algorithms for streamflow time series forecasting problem. Applied Soft Computing, 105, 107282.

23. Nguyen, B. M., Hoang, B., **Nguyen, T.**, & Nguyen, G. (2021). nQSV-Net: a novel queuing search variant for global space search and workload modeling. Journal of Ambient Intelligence and Humanized Computing, 12(1), 27-46.

24. Nguyen, B. M., Tran, T., **Nguyen, T.**, & Nguyen, G. (2020). Hybridization of galactic swarm and evolution whale optimization for global search problem. IEEE Access, 8, 74991-75010.

25. **Nguyen, T.**, Nguyen, T., Nguyen, B. M., & Nguyen, G. (2019). Efficient time-series forecasting using neural network and opposition-based coral reefs optimization. International Journal of Computational Intelligence Systems, 12(2), 1144-1161.

B. Conferences:

1. Nguyen, Ngoc Hung, **Nguyen Van Thieu**, Minh-Hoang Pham, and Van-Dinh Nguyen. "Adaptive Task Scheduling under Hard Deadlines in Edge Environments Using Deep Reinforcement Learning." In 2025 International Technical Conference on Circuits/Systems, Computers, and Communications (ITC-CSCC), pp. 1-5. IEEE, 2025.

2. **Nguyen, T.**, Nguyen, T., Vu, Q. H., Huynh, T. T. B., & Nguyen, B. M. (2021, September). Multi-objective sparrow search optimization for task scheduling in fog-cloud-blockchain systems. In 2021 IEEE International Conference on Services Computing (SCC) (pp. 450-455). IEEE.

3. **Nguyen, T.**, Kobayashi, S., & Fukuda, K. (2021, May). Logdtl: Network log template generation with deep transfer learning. In 2021 IFIP/IEEE International Symposium on Integrated Network Management (IM) (pp. 848-853). IEEE.

4. Nguyen, B. M., Nguyen, T., **Nguyen, T.**, & Do, B. L. (2021, May). MPoC-A metaheuristic proof of criteria consensus protocol for blockchain network. In 2021 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)

(pp. 1-8). IEEE.

5. **Nguyen, T.**, Nguyen, G., & Nguyen, B. M. (2020). EO-CNN: an enhanced CNN model trained by equilibrium optimization for traffic transportation prediction. Procedia Computer Science, 176, 800-809.

6. **Nguyen, T.**, Hoang, B., Nguyen, G., & Nguyen, B. M. (2020). A new workload prediction model using extreme learning machine and enhanced tug of war optimization. Procedia Computer Science, 170, 362-369.

7. **Nguyen, T.**, Nguyen, B. M., & Nguyen, G. (2019, March). Building resource auto-scaler with functional-link neural network and adaptive bacterial foraging optimization. In International Conference on Theory and Applications of Models of Computation (pp. 501-517). Cham: Springer International Publishing.

8. **Nguyen, T.**, Tran, N., Nguyen, B. M., & Nguyen, G. (2018, November). A resource usage prediction system using functional-link and genetic algorithm neural network for multivariate cloud metrics. In 2018 IEEE 11th conference on service-oriented computing and applications (SOCA) (pp. 49-56). IEEE.

C. Book Chapters:

1. Vu, Thai Ha, Ngoc Quang Vu, and **Nguyen Van Thieu**. "Spatial prediction of bridge displacement using deep learning models: A case study at Co Luy bridge." In Applications of Artificial Intelligence in Mining and Geotechnical Engineering, pp. 437-461. Elsevier, 2024.

REVIEWER SERVICE

- IEEE Transactions On Software Engineering
- IEEE Transactions on Cybernetics
- IEEE Transactions on Affective Computing
- IEEE Transactions on Mobile Computing
- IEEE Transactions On Evolutionary Computation
- IEEE Transactions On Emerging Topics In Computational Intelligence
- IEEE Transactions On Systems Man And Cybernetics Systems
- Evolutionary Intelligence
- Journal of Cloud Computing
- Memetic Computing
- Softwarex
- Multimedia Tools And Applications
- Environmental Modelling And Software
- Plos One
- Mobile Networks And Applications
- Journal Of Open Research Software
- Applied Intelligence
- Complex And Intelligent Systems
- Journal Of King Saud University
- IEEE Transactions on Industrial Informatics
- IEEE Internet Of Things
- IEEE Transactions on Consumer Electronics
- IEEE Sensor Letters
- IEEE Access
- Journal Of Systems Architecture
- Journal Of Computer Assisted Learning
- Neurocomputing
- Swarm And Evolutionary Computation
- Artificial Intelligence Review
- Knowledge Based Systems
- Engineering Applications Of Artificial Intelligence
- Computer Networks
- Information Sciences
- Scientific Reports
- Neural Processing Letters
- Tsinghua Science And Technology

TECHNICAL SKILLS

Operating Systems: Windows, GNU/Linux (Ubuntu)
Programming:

- **Language**: Python, Java, PHP, Javascript, C/C++

- **AI Frameworks**: Numpy, Pandas, Scikit-Learn, Pytorch , Tensorflow, Keras

- **Web Development**: HTML, CSS, Materialize, Bootstrap, Angular 2, Flask, Nodejs, Express, Spring Framework

- **App Development**: Java Android, Ionic Framework

- **Database**: MySQL, MongoDB

AWARDS AND CERTIFICATIONS

- Achieved the Erasmus+ scholarship for International Exchange Student to University of Luxembourg (07/2019)
  + Organizations: European Union (EU) and University of Luxembourg

- Achieved the NII International Internship Program for International Exchange Student to NII, Japan (02/2020)
  + Organizations: National Institute of Informatics (NII), Japan

REFERENCES

Dr. Vu Nguyen HA
Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg.

Prof. Symeon CHATZINOTAS
Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg.

Assoc. Prof. Diego Oliva
Department of Computer Sciences, Universidad de Guadalajara, Mexico.

Prof. Seyedali Mirjalili
Centre for Artificial Intelligence Research and Optimization, Torrens University Australia, Australia

Dr. Hoang Nguyen
Mining Faculty, Hanoi University of Mining and Geology, Viet Nam

Assoc. Prof. Binh Minh Nguyen
Ha Noi University of Science and Technology, Viet Nam.