Teerapong Panboonyuen

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CURRENT ROLES

- **MARS (Motor AI Recognition Solution)** — Bangkok, Thailand
  Senior Research Scientist (Artificial Intelligence Laboratory)
  https://kaopanboonyuen.github.io/MARS — 2022–present
- **Chulalongkorn University** — Bangkok, Thailand
  Postdoctoral Researcher in AI (Advancing Geoscience Laboratory)
  https://kaopanboonyuen.github.io/MeViT — 2021–present
- **College of Computing, Khon Kaen University** — Khon Kaen, Thailand
  Visiting Faculty (Visiting Lecturer in AI and Data Science)
  https://kaopanboonyuen.github.io/SC310005 — 2021–present

EDUCATION

- **Postdoctoral Research Fellow** — 2021–2026
  Chulalongkorn University, H-Index: 10
- **Ph.D. Computer Engineering** — 2018–2020
  Chulalongkorn University, GPA: 4.00
- **M.Eng. Computer Engineering** — 2016–2017
  Chulalongkorn University, GPA: 4.00
- **B.Eng. Computer Engineering** — 2012–2015
  KMUTNB (Top 1% in University Mathematics)
- **Pre-Electrical Engineering (PET21)** — 2010–2012
  KMUTNB (Senior High School: 10th - 12th Grade)

AWARDS

Scholarships and merit awards:

- H.M. the King Bhumibhol Adulyadej's 72nd Birthday Anniversary Scholarship (Master)
- The 100th Anniversary Chulalongkorn University Fund for Doctoral Scholarship (Ph.D.)

- The 90th Anniversary of Chulalongkorn University Scholarship (Ph.D.)
- Ratchadapisek Research Funds (RRF) for Postdoctoral Fellowship (Chula, 2021-2025)
- The Second Century Fund Office (C2F) for Postdoctoral Fellowship (Chula, 2025-2026)
- Top 1% Score in University Differential Calculus and Engineering Mathematics

Best paper awards:

- 2017 Best Student Paper Award in International Conference on Computing and Information Technology (IC2IT)
- 2019 Best Young Researcher Paper Award in First International Conference on Smart Technology & Urban Development (STUD)

Athletic achievements:

- 2022 Bangkok Marathon 42.195K Finisher (Bangkok Marathon)
- 2024 IRONMAN 70.3 Finisher (1.9K swim, 90K bike ride, and 21.1K run) (IM70.3)
- 2024 Laguna Phuket Triathlon Finisher (1.8K swim, 55K bike ride, and 12K run) (LPT)
- 2025 Chombueng Marathon 42.195K Finisher (Chombueng Marathon)

Other recognitions:

- 2024 Distinguished Reviewer for the Bronze Level of IEEE Transactions on Medical Imaging (IEEE Transactions)
- 2025 Main Oral Presentation, 1 of 8 Selected at the 14th Critical Care Conference, King Chulalongkorn Memorial Hospital, Bangkok, Thailand.
- 2025 Global Young Scientists Summit (GYSS) Scholarship from Her Royal Highness Princess Maha Chakri Sirindhorn (GYSS)

PUBLICATIONS

Google Scholar: https://scholar.google.co.th/citations?user=myy0qDgAAAAJ&hl=en

1. **Panboonyuen, Teerapong**, KAO: Kernel-Adaptive Optimization in Diffusion for Satellite Image. *IEEE Transactions on Geoscience and Remote Sensing*, 2025. TGRS.2025.3621738. `https://kaopanboonyuen.github.io/KAO`
2. **Panboonyuen, Teerapong**, et al. GuidedBox: A Segmentation-Guided Box Teacher-Student Approach for Weakly Supervised Road Segmentation. European Journal of Remote Sensing, Volume 58, Issue 1 (2025). DOI:10.1080/22797254.2025.2540963. `https://kaopanboonyuen.github.io/GuidedBox`

3. **Panboonyuen, Teerapong**. CU-ICU: Customizing Unsupervised Instruction-Finetuned Language Models for ICU Datasets via Text-to-Text Transfer Transformer. (2025) arXiv paper: https://arxiv.org/abs/2507.13655

4. **Panboonyuen, Teerapong**. SLICK: Selective Localization and Instance Calibration for Knowledge-Enhanced Car Damage Segmentation in Automotive Insurance. (2025) arXiv paper: https://arxiv.org/abs/2506.10528

5. **Panboonyuen, Teerapong**. ALBERT: Advanced Localization and Bidirectional Encoder Representations from Transformers for Automotive Damage Evaluation. (2025) arXiv paper: https://arxiv.org/abs/2506.10524

6. **Panboonyuen, Teerapong**. SEA-ViT: Sea Surface Currents Forecasting Using Vision Transformer and GRU-Based Spatio-Temporal Covariance Modeling. https://ieeexplore.ieee.org/document/11003320 (KST2025)

7. **Panboonyuen, Teerapong**. REG: Refined Generalized Focal Loss for Road Asset Detection on Thai Highways Using Vision-Based Detection and Segmentation Models. https://ieeexplore.ieee.org/document/11003314 (KST2025)

8. **Panboonyuen, Teerapong**, et al. SatDiff: A Stable Diffusion Framework for Inpainting Very High-Resolution Satellite Imagery. IEEE Access (2025). https://ieeexplore.ieee.org/document/10929005

9. **Panboonyuen, Teerapong**, et al. CHULA: Custom Heuristic Uncertainty-guided Loss for Accurate Land Title Deed Segmentation. IEEE Access (2025). https://ieeexplore.ieee.org/document/11146788

10. **Panboonyuen, Teerapong**, et al. MeViT: A Medium-Resolution Vision Transformer for Semantic Segmentation on Landsat Satellite Imagery for Agriculture in Thailand. Remote Sensing 15.21 (2023): 5124. https://www.mdpi.com/2072-4292/15/21/5124

11. **Panboonyuen, Teerapong**, et al. MARS: Mask Attention Refinement with Sequential Quadtree Nodes for Car Damage Instance Segmentation. International Conference on Image Analysis and Processing. Cham: Springer Nature Switzerland, 2023. https://link.springer.com/chapter/10.1007/978-3-031-51023-6_3

12. **Panboonyuen, Teerapong**, **(Ph.D. thesis)** Semantic Segmentation on Remotely Sensed Images Using Deep Convolutional Encoder-Decoder Neural Network. Doctor of Philosophy, Chulalongkorn University Theses and Dissertations (Chula ETD). 8534. (2019). https://digital.car.chula.ac.th/chulaetd/8534/

13. **Panboonyuen, Teerapong**, **(Graduate thesis)** Semantic Road Segmentation on Remotely-Sensed Images Using Deep Convolutional Neural Networks and Landscape Metrics. Master of Engineering, Chulalongkorn University Theses and Dissertations (Chula ETD). (2016). https://www.car.chula.ac.th/display7.php?bib=2156287

14. **Panboonyuen, Teerapong**, et al. Object Detection of Road Assets Using Transformer-Based YOLOX with Feature Pyramid Decoder on Thai Highway Panorama. Information 13.1 (2022): 5. https://www.mdpi.com/2078-2489/13/1/5

15. **Panboonyuen, Teerapong**, et al. Transformer-Based Decoder Designs for Semantic Segmentation on Remotely Sensed Images. Remote Sensing 13.24 (2021): 5100. https://www.mdpi.com/2072-4292/13/24/5100

16. **Panboonyuen, Teerapong**, et al. Semantic Labeling in Remote Sensing Corpora Using Feature Fusion-Based Enhanced Global Convolutional Network with High-Resolution Representations and Depthwise Atrous Convolution. Remote Sensing 12.8 (2020): 1233. https://www.mdpi.com/2072-4292/12/8/1233

17. **Panboonyuen, Teerapong**, et al. Semantic Segmentation on Remotely Sensed Images Using an Enhanced Global Convolutional Network with Channel Attention and Domain Specific Transfer Learning. Remote Sensing 11.1 (2019): 83. https://www.mdpi.com/2072-4292/11/1/83

18. **Panboonyuen, Teerapong**, et al. Road Segmentation of Remotely-Sensed Images Using Deep Convolutional Neural Networks with Landscape Metrics and Conditional Random Fields. Remote Sensing 9.7 (2017): 680. https://www.mdpi.com/2072-4292/9/7/680

19. **Panboonyuen, Teerapong**, et al. An Enhanced Deep Convolutional Encoder-Decoder Network for Road Segmentation on Aerial Imagery. International Conference on Computing and Information Technology. Springer, Cham, 2017. https://www.mdpi.com/2072-4292/9/7/680

20. **Panboonyuen, Teerapong**, et al. Image Vectorization of Road Satellite Data Sets. Journal of Remote Sensing and GIS Association of Thailand (2017). https://learn.gistda.or.th

21. Wichakam, I., **Panboonyuen, T.**, Udomcharoenchaikit, C., and Vateekul, P. Real-Time Polyps Segmentation for Colonoscopy Video Frames Using Compressed Fully Convolutional Network. International Conference on Multimedia Modeling (2018): 393-404. https://link.springer.com/chapter/10.1007/978-3-319-73603-7_32

22. Vajeethaveesin, T., **Panboonyuen, T.**, et al. A Performance Comparison between GIS-based and Neural Network Methods for Flood Susceptibility Assessment in Ayutthaya Province. Trends in Sciences 19.2 (2022): 2038. https://tis.wu.ac.th/index.php/tis/article/view/2038

23. Vateekul, P., **Panboonyuen, T.**, et al. Road Map Extraction from Satellite Imagery Using Connected Component Analysis and Landscape Metrics. IEEE Big Data (2017): 3435-3442. https://ieeexplore.ieee.org/document/8258330

24. Chantharaj, S., **Panboonyuen, T.**, et al. Semantic Segmentation on Medium-Resolution Satellite Images Using Deep Convolutional Networks with Remote Sensing Derived Indices. JCSSE (2018): 1-6. https://ieeexplore.ieee.org/document/8457378

25. Kantavat, P., **Panboonyuen, T.**, et al. Transportation Mobility Factor Extraction Using Image Recognition Techniques. STUD 2019. https://ieeexplore.ieee.org/document/9018796

26. Intarat, K., **Panboonyuen, T.**, et al. Enhanced Feature Pyramid Vision Transformer for Semantic Segmentation on Thailand Landsat-8 Corpus. Information (2022). https://www.mdpi.com/2078-2489/13/5/259

27. Thitisiriwech, K., **Panboonyuen, T.**, et al. The Bangkok Urbanscapes Dataset for Semantic Urban Scene Understanding Using Enhanced Encoder-Decoder Networks. IEEE Access (2022). https://ieeexplore.ieee.org/document/9779212

28. Thitisiriwech, K., **Panboonyuen, T.**, et al. Quality of Life Prediction in Driving Scenes on Thailand Roads Using Deep Convolutional Neural Networks. Sustainability 15.3 (2023): 2847. https://www.mdpi.com/2071-1050/15/3/2847

29. Intarat, K., **Panboonyuen, T.**, et al. Deep Residual Neural Networks with Self-Attention for Landslide Susceptibility Mapping in Uttaradit Province, Thailand. GIS-IDEAS: Advancing Geospatial Innovation. (2024). https://gis-ideas.org/2024

30. Nithisopa, N., **Panboonyuen, T.** (2025, February). DOTA: Deformable Optimized Transformer Architecture for End-to-End Text Recognition with Retrieval-Augmented Generation. In *2025 17th International Conference on Knowledge and Smart Technology (KST)* (pp. 301–306). IEEE.

31. Dechsupa, C., **Panboonyuen, T.**, Vatanawood. (2025). Towards AI-Augmented Formal Verification: A Preliminary Investigation of ENGRU and Its Challenges. IEEE Access.

32. Sermsri, K., **Panboonyuen, T.** (2025). Debiasing Large Language Models in Thai Political Stance Detection via Counterfactual Calibration. In *Proceedings of the Widening NLP Workshop (WiNLP) at EMNLP 2025*, Suzhou, China. Association for Computational Linguistics. https://arxiv.org/abs/2509.21946 (To appear).

33. Charoenphon, C., **Panboonyuen, T.**, Zhang, B., Satirapod, C. (2025). Investigating the use of deep learning-derived weighted mean temperature for GPS-PWVs estimation. Journal of Spatial Science, 1-22.

TECHNICAL SKILLS

- **Programming Languages:** Python, Java, Golang, R, MATLAB, C
- **Machine Learning & Deep Learning:** PyTorch, TensorFlow, Keras, Theano, Scikit-Learn
- **Large Language Models (LLMs) & Generative AI:** GPT, BERT, T5, QWEN, ChatGPT, Gemini, Claude, Retrieval-Augmented Generation (RAG)
- **AI Toolkits & Libraries:** Transformers, Hugging Face, Langchain, OpenAI API, SHAP, LIME, Fairness Indicators
- **Data Science & Visualization:** Pandas, Plotly, Power BI, Tableau, Looker Studio
- **Model Experimentation & Monitoring:** Weights and Biases (WandB), TensorBoard, Gradio, Streamlit
- **Web Scraping & Automation:** Beautiful Soup, Selenium
- **Web Development:** HTML, CSS, JavaScript, RESTful APIs, Flask, Basic Full-Stack Development

- **Cloud, DevOps & Infrastructure:** Docker, Docker-Compose, Kubernetes, Git, Google Cloud Platform (GCP), Amazon Web Services (AWS)
- **Databases & Geospatial:** PostgreSQL, MySQL, SQLite, SQL, GDAL
- **Other Tools:** Swagger UI, RapidMiner Studio, Jupyter Notebook, Google Colab

GitHub: https://github.com/kaopanboonyuen

OPEN SOURCE PROJECTS

- **KAO:** https://kaopanboonyuen.github.io/KAO/
  A novel framework for satellite image inpainting using Kernel-Adaptive Optimization within diffusion models. Designed for very high-resolution (VHR) datasets like DeepGlobe and the Massachusetts Roads Dataset, KAO introduces Latent Space Conditioning for efficient restoration and Explicit Propagation for forward-backward fusion. It balances the speed of preconditioned models with the flexibility of postconditioned methods, setting a new benchmark in VHR satellite image restoration.
- **MARS:** https://kaopanboonyuen.github.io/MARS/
  A state-of-the-art deep learning model for car damage instance segmentation. MARS leverages sequential quadtree attention to outperform existing methods like Mask R-CNN, PointRend, and Mask Transfiner, achieving +1.3 maskAP (R50-FPN) and +2.3 maskAP (R101-FPN) on a Thai car damage dataset. Presented at ICIAP 2023 in Udine, Italy. Developed by MARSAIL (Motor AI Recognition Solution Artificial Intelligence Laboratory).
- **FusionNetGeoLabel:** https://kaopanboonyuen.github.io/FusionNetGeoLabel/
  A novel deep learning framework from my Ph.D. research for the semantic segmentation of remote sensing images. It integrates a high-resolution backbone, multi-scale feature fusion, and depthwise atrous convolutions to preserve spatial details and enhance context understanding.
- **SatDiff: Stable Diffusion Framework for Inpainting Very High-Resolution Satellite Imagery:**
  https://kaopanboonyuen.github.io/SatDiff/
  Proposed a generative AI framework based on Stable Diffusion for filling occluded regions in high-resolution satellite imagery. SatDiff introduces a dual-branch, attention-enhanced architecture that preserves semantic consistency and fine structural details, outperforming existing methods in PSNR, SSIM, and visual quality across multiple remote sensing datasets.
- **CHULA: Custom Heuristic Uncertainty-Guided Loss for Vision Tasks:**
  https://kaopanboonyuen.github.io/CHULA/
  Developed a novel uncertainty-guided loss function that integrates class-balanced cross-entropy, aleatoric uncertainty modeling, and domain-specific heuristics to significantly enhance performance across segmentation and detection tasks in computer vision.
- **SEA-ViT: Sea Surface Currents Forecasting with Vision Transformers and GRUs:**
  https://kaopanboonyuen.github.io/GISTDA-SeaViT/
  Proposed a novel spatio-temporal forecasting model combining Vision Transformers and GRU-based covariance modeling to accurately predict sea surface currents, advancing oceanographic forecasting capabilities with deep learning.

- **GuidedBox: Segmentation-Guided Box Teacher-Student Framework for Weakly Supervised Road Segmentation:**
  https://kaopanboonyuen.github.io/GuidedBox/
  Developed a weakly supervised approach for road segmentation in remote sensing that leverages segmentation-guided box annotations. Using a teacher-student framework, it generates precise pseudo masks and dynamically optimizes learning, reducing annotation effort while improving segmentation accuracy.

- **AI-Driven Image Recognition for Transportation Mobility and Quality of Life in Bangkok:** https://github.com/kaopanboonyuen/QOL-TransportAI
  Leveraging AI to enhance urban mobility and improve the Quality of Life (QOL) for city residents, this project replaces costly, slow questionnaire surveys with scalable, image-based recognition systems that analyze transportation patterns in real-time.

- **MeViT: Medium-Resolution Vision Transformer for Crop Segmentation in Thailand:** https://kaopanboonyuen.github.io/MeViT
  Introducing MeViT, a tailored Vision Transformer optimized for medium-resolution Landsat imagery to accurately segment key Thai economic crops such as para rubber, corn, and pineapple—enabling improved agricultural monitoring and management.

- **Flood Risk Assessment Using Explainable Machine Learning:**
  https://github.com/kaopanboonyuen/RainNet-ML
  Developed a robust predictive model combining Random Forest, Gradient Boosting, SVM, and Neural Networks, enhanced with LIME and SHAP for model transparency, to deliver actionable flood risk insights from complex environmental data.

- **GeoAI-Landslides: Self-Attention Enhanced Deep Learning for Landslide Susceptibility Mapping:**
  https://kaopanboonyuen.github.io/GeoAI-Landslides/
  Proposed an improved deep learning framework for landslide susceptibility mapping using ResNet152 integrated with multi-head self-attention. The model captures complex spatial dependencies in geospatial data, achieving high performance (91.59% F1-score, 0.9678 AUC) and enabling more accurate, interpretable landslide risk assessments in high-risk regions like Uttaradit, Thailand.

- **REG: Refined Generalized Focal Loss for Road Asset Detection on Thai Highways:**
  https://github.com/kaopanboonyuen/REG
  Introduced REG, a novel loss function that fuses focal loss, spatial refinement, and probabilistic uncertainty for improved road asset detection and segmentation. Deployed in a unified multi-task model, REG achieves 80.34% mAP (AP50) and 77.87% F1-score on real-world Thai highway datasets. Built with a modular PyTorch codebase and Dockerized for scalable deployment.

- **Bangkok Urbanscapes Dataset for Semantic Urban Scene Understanding:**
  https://kaopanboonyuen.github.io/bkkurbanscapes
  Created a novel dataset and deep learning framework to advance self-driving technology in Thailand, addressing unique traffic and road conditions to help autonomous systems navigate complex urban environments like Bangkok and similar cities.

PAST RESEARCH AND WORK EXPERIENCE

- **MARS, Senior Research Scientist** Bangkok
  (Motor AI Recognition Solution) 2022–Present
  Managers: Naruepon Pornwiriyakul (IT), Innapha Tantanavivat (TVI)
  - Pioneered and led the development of MARS: Mask Attention Refinement with Sequential Quadtree Nodes, a transformer-based model for high-precision car damage instance segmentation, published and presented at ICIAP 2023, Italy.
  - Initiated and led research in Explainable AI, Computer Vision, and Semantic Distillation for real-time, in-field automotive damage assessment.
  - Published (4) SLICK: Selective Localization and Instance Calibration for Knowledge-Enhanced Car Damage Segmentation, a distilled student model derived from ALBERT that accelerates inference speed by over 700% on real-world customer images, enabling scalable and efficient automotive damage assessment.
  - Published (3) ALBERT: Advanced Localization and Bidirectional Transformers for Vehicle Damage Evaluation, introducing a high-capacity transformer architecture that achieves precise vehicle damage localization with state-of-the-art accuracy.
  - Published (2) DOTA: Deformable Optimized Transformer Architecture for End-to-End Text Recognition with Retrieval-Augmented Generation, a novel end-to-end framework that significantly enhances OCR performance.
  - Published (1) MARS: Mask Attention Refinement with Sequential Quadtree Nodes for Car Damage Segmentation, leveraging advanced self-attention mechanisms and quadtree transformers to significantly improve mask accuracy in complex and cluttered automotive scenes.
  - Engineered a custom distillation framework combining instance-level calibration, semantic pruning, and spatial refinement, enabling scalable AI use in low-power environments.
- **CJ Express Group, AI Research Scientist (Department Manager)** Bangkok
  Data Innovation Laboratory 2020–2021
  Managers: Narong Intiruk (CJ), Jarun Ngamvirojcharoen (TILDI)
  - Spearheaded the development of demand forecasting systems using PySpark and Cognitive Computing, significantly enhancing retail operational efficiency.
  - Optimized time-series forecasting for retail using advanced stats, machine learning (e.g., Gradient Boosting), and cutting-edge techniques like deep learning and ensemble methods.
  - Engineered scalable solutions on Google Cloud to streamline data pipelines and ensure reliable model deployment in production environments.
  - Integrated MLOps practices to automate machine learning workflows, improving model lifecycle management and deployment efficiency.
- **Chulalongkorn University, Postdoctoral Researcher (C2F)** Bangkok
  Advancing Geoscience Laboratory 2021–Present
  Co-authors: Chalermchon Satirapod (Head), Chaiyut Charoenphon
  - Independently researched and developed sequence-to-sequence models for land use and land cover (LULC) classification using remote sensing datasets.

- Published (4) GuidedBox: A Segmentation-Guided Box Teacher-Student Approach for Weakly Supervised Road Segmentation, presenting a teacher-student framework that leverages segmentation-guided boxes to enhance weakly supervised road extraction in remote sensing imagery.
- Published (3) CHULA: Custom Heuristic Uncertainty-guided Loss for Accurate Land Title Deed Segmentation, introducing a novel uncertainty-guided loss function to improve the accuracy and reliability of land title deed segmentation.
- Published (2) SatDiff: A Stable Diffusion Framework for Inpainting Very High-Resolution Satellite Imagery, a pioneering method integrating generative AI (Stable Diffusion) to enhance the resolution and synthesize realistic satellite imagery.
- Published (1) MeViT: A Medium-Resolution Vision Transformer for Semantic Segmentation on Landsat Satellite Imagery for Agriculture in Thailand, demonstrating a novel deep learning approach for satellite image analysis in agriculture.

- **Khon Kaen University, Visiting Faculty** — Khon Kaen
  Special Lecturer in AI and Data Science — 2021–Present
  Recruiter: Chanon Dechsupa
  - Delivered courses such as Artificial Intelligence and Smart Process Management.
  - Authored refined syllabi and received recognition via ministerial orders:
  - Order 660101.26/9304, Order 660101.26/24844, Order 660101.26/13320.

- **Chulalongkorn University, Graduate Teaching Assistant** — Bangkok
  Machine Intelligence and Knowledge Discovery Lab — 2016–2020
  Mentor: Peerapon Vateekul
  - Co-taught courses like **Big Data Tools**, **Python**, **Data Science and Engineering**, among others. https://github.com/kaopanboonyuen/2110446_DataScience_2021s2
  - Delivered online courses on Data Analytics and Big Data through Chula MOOC.
  - Researched Transformer-based decoder designs, leveraging Swin Transformer to achieve state-of-the-art. https://github.com/kaopanboonyuen/FusionNetGeoLabel

- **GISTDA, Freelance AI Specialist** — Bangkok
  (Geo-Informatics and Space Technology Development Agency) — 2016–2020
  Manager: Siam Lawawirojwong
  - Developed LULC mapping systems using Vision Transformers and Graph Neural Networks.
  - Built systems for forest fire classification in LANDSAT-8 satellite imagery.

- **DEPA, AI Researcher (PT)** — Bangkok
  (Digital Economy Promotion Agency) — 2019–2020
  Recruiter: Preesan Rakwatin
  - Developed an unsupervised system to classify sugarcane plantations in Thailand using satellite imagery.
  - Designed and trained models for delineating sugarcane field boundaries in Thailand, employing DETR architectures with collaborative hybrid assignment training methodologies.

- **Centaco Farm Company Limited, Data Scientist (PT)** Bangkok
  Applied AI for Livestock 2019–2020
  Manager: Ms. Kung, Doctor of Veterinary Medicine
  - Designed a hatchability prediction model for broiler chickens using ensemble learning methods such as Gradient Boosting Machines (GBM) and Random Forests.
  - Captured nonlinear quadratic effects between breeder age and hatchability via Polynomial Kernel Support Vector Regression (SVR) and feature transformation.
  - Implemented Bayesian Optimization for hyperparameter tuning, improving model accuracy and robustness.
  - Developed an interpretable AI framework using SHAP (SHapley Additive exPlanations) to explain model predictions for veterinary decision support.
- **Bangkok Innovation House, Lead Data Science Mentor (PT)** Bangkok
  Data Science Pathway Team, Chula MOOC 2018–2020
  Manager: Pahnit Seriburi
  - Served as **Head TA** for the data science pathway team at Chula MOOC.
  - Spearheaded volunteer teaching in Practical Data Analytics using RapidMiner and Python.
  - Delivered hands-on learning experiences, helping students gain practical skills in data science. https://github.com/kaopanboonyuen/Python-Data-Science
- **NetDesign School, Python Programming Trainer (PT)** Bangkok
  Training Program 2019–2019
  - Conducted Python programming training sessions at NetDesign School, located on the 4th floor of Siam Paragon, Bangkok.
  - Delivered beginner to intermediate-level Python courses, focusing on practical applications and problem-solving.
  - Empowered students with foundational coding skills to pursue further studies or career opportunities in programming.

SERVICE TO PROFESSION

More reviews can be found under my WoS ID: **AAO-4985-2020**

Invited Reviewers:

- ACM Transactions on Asian and Low-Resource Language Information Processing (ACM)
- ACM Transactions on Autonomous and Adaptive Systems (Publisher: ACM)
- ACM Transactions on Multimedia Computing Communications and Applications (ACM)
- ACM Transactions on Intelligent Systems and Technology (Publisher: ACM)
- ACM Transactions on Knowledge Discovery from Data (Publisher: ACM)

- ACM Transactions on Privacy and Security (Publisher: ACM)
- ACM Transactions on Spatial Algorithms and Systems (Publisher: ACM)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
- IEEE Transactions on Aerospace and Electronic Systems (Publisher: IEEE)
- IEEE Transactions on AgriFood Electronics (Publisher: IEEE)
- IEEE Transactions on Artificial Intelligence (Publisher: IEEE)
- IEEE Transactions on Automation Science and Engineering (Publisher: IEEE)
- IEEE Transactions on Big Data (Publisher: IEEE)
- IEEE Transactions on Circuits and Systems for Video Technology (Publisher: IEEE)
- IEEE Transactions on Cognitive Communications and Networking (Publisher: IEEE)
- IEEE Transactions on Computational Social Systems (Publisher: IEEE)
- IEEE Transactions on Consumer Electronics (Publisher: IEEE)
- IEEE Transactions on Emerging Topics in Computational Intelligence (Publisher: IEEE)
- IEEE Transactions on Geoscience and Remote Sensing (Publisher: IEEE)
- IEEE Transactions on Image Processing (Publisher: IEEE)
- IEEE Transactions on Industrial Informatics (Publisher: IEEE)
- IEEE Transactions on Human-Machine Systems (Publisher: IEEE)
- IEEE Transactions on Medical Imaging (Publisher: IEEE) – **Certificate**
- IEEE Transactions on Neural Networks and Learning Systems (Publisher: IEEE)
- IEEE Transactions on Radiation and Plasma Medical Sciences (Publisher: IEEE)
- IEEE Transactions on Systems, Man, and Cybernetics Systems (Publisher: IEEE)
- IEEE Transactions on Vehicular Technology (Publisher: IEEE)
- IEEE Access (Publisher: IEEE)
- IEEE Consumer Electronics Magazine (Publisher: IEEE)
- IEEE Intelligent Systems (Publisher: IEEE)
- IEEE Journal of Biomedical and Health Informatics (Publisher: IEEE)
- IEEE MultiMedia (Publisher: IEEE)
- Discover Applied Sciences (Publisher: Nature)
- Scientific Reports (Publisher: Nature) – **Certificate**

- Applied Geomatics (Publisher: Springer) – **Certificate**
- Artificial Intelligence Review (Publisher: Springer Nature) – **Certificate**
- The Visual Computer (Publisher: Springer Nature) – **Certificate**
- Neural Processing Letters (Publisher: Springer Nature) – **Certificate**
- Signal, Image and Video Processing (Publisher: Springer Nature) – **Certificate**
- Earth Science Informatics(Publisher: Springer Nature) – **Certificate**
- The Journal of Supercomputing (Publisher: Springer Nature)
- Pattern Recognition (Publisher: Elsevier) – **Certificate**
- Neurocomputing (Publisher: Elsevier) – **Certificate**
- Computer Vision and Image Understanding (Publisher: Elsevier) – **Certificate**
- Neural Networks (Publisher: Elsevier) – **Certificate**
- Computers and Geosciences (Publisher: Elsevier)
- CAAI Transactions on Intelligence Technology (Publisher: Elsevier)
- Tsinghua Science and Technology (Publisher: Elsevier)
- Plant Methods (Publisher: BioMed Central) – **Certificate**
- Journal of Vibration and Control (Publisher: Springer)
- Biomedical Engineering/Biomedizinische Technik (Publisher: Springer)
- Food Bioengineering (Publisher: Springer)
- AI in Precision Oncology (Publisher: Springer)
- Acta Oceanologica Sinica (Publisher: Springer)
- Robotica (Publisher: Springer)
- Journal of Harbin Institute of Technology (New Series) (Publisher: Springer)
- Nuclear Science and Techniques (Publisher: Springer)
- Big Earth Data (Publisher: Taylor and Francis)
- European Journal of Remote Sensing (Publisher: Taylor and Francis)
- Geo-spatial Information Science (Publisher: Taylor and Francis)
- Computer Methods in Biomechanics and Biomedical Engineering
- Journal of Intelligent Transportation Systems: Technology, Planning, and Operations
- Journal of Spatial Science (Publisher: Taylor and Francis)

- Smart Science (Publisher: Taylor and Francis)
- Geocarto International (Publisher: Taylor and Francis)
- Smart Science (Publisher: Taylor and Francis)
- International Journal of Remote Sensing (Publisher: Taylor and Francis)
- International Journal of Image and Data Fusion (Publisher: Taylor and Francis)
- International Journal of Digital Earth (Publisher: Taylor and Francis)
- International Journal of Building Pathology and Adaptation (Publisher: Taylor and Francis)
- International Journal of Imaging Systems and Technology (Publisher: Wiley) – **Certificate**
- International Journal of Circuit Theory and Applications (Publisher: Wiley)
- Journal of Phytopathology (Publisher: Wiley)
- Transactions in GIS (Publisher: Wiley) – **Certificate**
- Applied AI Letters (Publisher: Wiley) – **Certificate**
- Engineering Reports (Publisher: Wiley) – **Certificate**
- Expert Systems (Publisher: Wiley) – **Certificate**
- PLOS ONE (Publisher: PLOS)
- IET Computer Vision (Publisher: IET) – **Certificate**
- IET Intelligent Transport Systems (Publisher: IET) – **Certificate**
- IET Smart Science (Publisher: IET)
- Electronics Letters (Publisher: IET)
- Remote Sensing (Publisher: MDPI)
- Forests (Publisher: MDPI)
- Agriculture (Publisher: MDPI)
- Agronomy (Publisher: MDPI)
- Mathematics (Publisher: MDPI)
- Sensors (Publisher: MDPI)
- Energies (Publisher: MDPI)
- Symmetry (Publisher: MDPI)
- ISPRS International Journal of Geo-Information (Publisher: MDPI)
- Big Data and Cognitive Computing (BDCC) (Publisher: MDPI)

- Mathematical and Computational Applications (MCA) (Publisher: MDPI)
- Processes (Publisher: MDPI)
- International Journal of Geo-Information (IJGI) (Publisher: MDPI)
- Journal of Vibration and Control (Publisher: SAGE)
- Research Methods in Medicine and Health Sciences (Publisher: SAGE)
- International Journal of High Performance Computing Applications (Publisher: SAGE)
- Ultrasonic Imaging (Publisher: SAGE)
- Composites and Advanced Materials (Publisher: SAGE)
- Science Progress (Publisher: SAGE)
- Part D: Journal of Automobile Engineering (Publisher: SAGE)
- Human-centric Computing and Information Sciences (Publisher: SpringerOpen)
- Journal of Computational Methods in Science and Engineering (Publisher: IOS Press)
- Journal of Chemical Engineering of Japan (Publisher: Society of Chemical Engineers, Japan)
- Journal of Communications and Networks (Publisher: Korean Institute of Communications and Information Sciences)

PRESS

- **The Leader Asia**: Dr. Teerapong and his team introduced their advanced AI for car damage detection at ICIAP 2023 in Udine, setting new accuracy standards with their innovative MARS model. Retrieved from: https://theleaderasia.com
- **Techsauce**: Highlighted their AI technology for automatic car damage assessment, earning recognition for excellence at ICIAP 2023 in Italy. Retrieved from: https://techsauce.co
- **LINE TODAY**: Showcased the MARS model at ICIAP 2023, noted for its high accuracy and setting new global standards in car damage detection. Retrieved from: https://today.line.me
- **Moneychat**: Reported the award-winning innovation in AI for car damage estimation presented at ICIAP 2023. Retrieved from: https://moneychat.co.th
- **Kaohoon**: Celebrated the award-winning success of MARS at ICIAP 2023. Retrieved from: https://www.kaohoon.com
- **Mitistock**: Introduced the MARS model, featuring advanced self-attention mechanisms for vehicle damage assessment in Thailand. Retrieved from: https://www.mitihoon.com
- **The Story Thailand**: Presented cutting-edge AI techniques in car wound detection, achieving high accuracy and setting international benchmarks.
  Retrieved from: https://www.thestorythailand.com

- **Media of Thailand**: Unveiled the MARS model at ICIAP 2023, recognized globally for its precision in car damage detection. Retrieved from: https://www.mediaofthailand.com
- **Thailand Insurance News**: Featured Dr. Teerapong's MARS model at ICIAP 2023 for its groundbreaking accuracy in car damage detection.
  Retrieved from: https://thailandinsurancenews.com
- **Chulalongkorn University**: Published a study on semantic road segmentation using deep convolutional neural networks. Retrieved from: https://www.car.chula.ac.th
- **Chula Engineering News**: Featured Dr. Teerapong's participation in the Global Young Scientists Summit (GYSS) 2025, highlighting academic leadership and global collaboration. Retrieved from: eng.chula.ac.th
- **Thaivivat Insurance**: Announced Dr. Teerapong's research recognition at UAMC 2025, emphasizing advancements in AI for urban analytics and mobility challenges. Retrieved from: thaivivat.co.th

COMMUNITY SERVICE

- **Young Scientists Quickfire Pitch** GYSS2025
  National University of Singapore, Singapore
  I presented MeViT, a Vision Transformer designed for high-precision segmentation of Landsat satellite images, at the Young Scientists Quickfire Pitch. This project aims to enhance geospatial data analysis using cutting-edge AI techniques. More Details
- **CUICU Large Language Model (LLM)** 14th Critical Care Conference
  King Chulalongkorn Memorial Hospital, Bangkok, Thailand
  I presented CUICU, an independent, self-funded project aimed at supporting ICU healthcare professionals in Thailand by building accessible AI tools. The project focuses on customizing unsupervised instruction-finetuned language models for critical care applications, addressing the challenges of limited labeled datasets and inadequate hospital infrastructure. Key areas of impact include fast predictions for early sepsis detection, accurate mortality risk estimation, and providing understandable, clinically relevant explanations. More Details
- **Smart Detective Workshop: AI-Powered Puzzle Solving** NAC2025 (NSTDA)
  Thailand Science Park, Pathum Thani, Thailand
  I was invited to lead a hands-on workshop for youth as part of the Youth Activities at the 20th NSTDA Annual Conference (NAC2025), held from March 26–28, 2025. In the "Smart Detective: AI-Powered Puzzle Solving" session, I introduced students to core concepts of deep learning and computer vision—including Vision Transformers—and guided them through building and training a simple AI model to detect "Waldo." More Details
- **Undergraduate Applied Mathematics Conference 2025 (UAMC2025)** KMITL, Bangkok, Thailand
  King Mongkut's Institute of Technology Ladkrabang (KMITL)
  I presented my undergraduate research at the 2025 Undergraduate in Applied Mathematics Conference (UAMC2025), an inter-university symposium hosted by KMITL, highlighting innovative applications of applied mathematics. More Details

- **Exploring Careers as an AI Research Scientist** 2024
  NSTDA, Pathum Thani, Thailand
  I discussed AI careers with high school students, highlighting opportunities in academia, industry, and generative AI research. More Details

- **Inspiring the Future of AI Innovations and Mastering LLM** 2024
  KMUTNB, Bangkok, Thailand
  I delivered a keynote to undergraduate students, focusing on the transformative impact of AI and advancements in Large Language Models (LLMs), such as ChatGPT. More Details

- **Geospatial Big Data Analytics** 2023
  GISTDA, Pathum Thani, Thailand
  I conducted a session on leveraging PySpark and distributed machine learning to analyze large-scale geospatial datasets, emphasizing the importance of interactive visualization tools for decision-making. More Details

- **Invited to Italy for ICIAP 2023 Presenting MARS Research** 2023
  University of Udine, Italy
  I presented my research on MARS, a model enhancing instance segmentation for car damage evaluation, at the ICIAP 2023 Workshop. More Details

- **Distributed Machine Learning Techniques for Geospatial Data** 2023
  GISTDA, Pathum Thani, Thailand
  I led a course on distributed machine learning, focusing on PySpark and TensorFlow for geospatial data applications, teaching efficient multi-GPU training strategies. More Details

- **Achieve Data Science First Meet** 2023
  Victor Club, Samyan Mitrtown, Bangkok, Thailand
  I spoke at a student event on leveraging data science and AI to help organizations stay competitive in today's data-driven world. More Details

TEACHING

- **Guest Lecturer and AI Committee Member - NSTDA One Day Camp** 2024
  Sirindhorn Science Home, Thailand
  Delivered a talk on AI research careers as part of the GYSS2025 scholarship program. Full Blog and Slide

- **Visiting Faculty - College of Computing, Khon Kaen University** 2022 - Present
  Khon Kaen, Thailand
  I teach courses in Artificial Intelligence, Machine Learning, and Business Intelligence, including:
  - SC310005 Artificial Intelligence and Machine Learning Application
  - CP020002 Smart Process Management
  - SC320002 Business Intelligence
  - CP020001 Introduction to Computers and Programming

- **Modern Integrated Survey Technology - Chulalongkorn University** 2023
  Bangkok, Thailand
  Guided students in applying machine learning techniques to survey engineering problems. Invitation Letter

- **AI Inspiration Course - Khon Kaen University** 2024
  Khon Kaen, Thailand
  Delivered a lecture on Generative AI: Current Trends and Practical Applications. Lecture Slide
- **The 7th KVIS Invitational Science Fair** 2024
  Kamnoetvidya Science Academy, Rayong, Thailand
  Served as a committee member for the AI project evaluation. Invitation Letter
- **Industrial Advisory Board (IAB) - ECE KMUTNB** 2024
  Bangkok, Thailand
  Contributed to curriculum assessment and provided feedback on course development. Invitation Letter
- **AI and ML Instructor - Nomklao Kunnathi Demonstration School** 2021
  Bangkok, Thailand
  Taught AI and ML in the Design Graphics Science curriculum for Grade 10 students. Invitation Letter
- **Deep Learning Instructor - Thammasat University** 2023
  Bangkok, Thailand
  Conducted a course on satellite data processing for advanced military and disaster missions. Invitation Letter
- **Senior Project Advisor - Thammasat University** 2022
  Bangkok, Thailand
  Advised senior geography students on AI-related projects. Invitation Letter
- **AI Instructor - Department of Lands, Thailand** 2024
  Bangkok, Thailand
  Delivered AI training on land title deed data analysis. Course Link

Innovative AI Tools and Solutions Developed

- **Next-Generation AI Toolkits** — Engineered advanced AI platforms leveraging state-of-the-art transformer architectures and large language models (LLMs) to automate complex data processing and decision-making workflows, significantly reducing manual effort and accelerating time-to-insight.
- **Efficient Model Distillation Pipelines** — Developed robust teacher-student frameworks for compressing large-scale models into lightweight, deployable versions without sacrificing accuracy, enabling scalable AI deployment across edge devices and resource-constrained environments.
- **Generative AI Applications** — Pioneered the integration of Stable Diffusion and GAN-based generative models to synthesize high-fidelity data augmentations and enhance satellite imagery resolution, boosting model robustness and predictive performance in geospatial analytics.
- **Agentic AI Systems** — Built intelligent multi-agent frameworks capable of autonomous reasoning and adaptive problem solving, demonstrating practical applications in automated research assistance and complex system optimization.

- **Custom AI Research Tools** — Created bespoke software leveraging transformer-based natural language understanding and explainability techniques (e.g., SHAP, attention visualization), empowering research teams to interpret and trust AI outputs in critical decision contexts.

Get to Know Me Better

- **Tech Enthusiast and Endurance Athlete**
  I'm passionate about leveraging technology to create meaningful impact. Outside of coding and AI research, I challenge myself with marathons and triathlons, pushing both physical and mental boundaries—embracing endurance as a metaphor for continuous growth.

- **About Me**[1]
  I'm Teerapong Panboonyuen, but you can call me Kao Panboonyuen or just Kao.

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