Muhamad Hilmil Muchtar Aditya Pradana

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Education

- **Kyushu Institute of Technology** — Kitakyushu, Japan
  Doctor Philosophy in Life Science and Systems Engineering — *October 2018 - September 2021*
  Thesis Title: Trajectory Mapping Based-Object Tracking and CNN Based-Textural Feature Extraction for Application to Aquaculture.
- **National Taiwan University of Science and Technology** — Taipei, Taiwan
  Master in Biomedical Engineering; GPA: 3.96/4.00 — *February 2015 - January 2017*
  Thesis Title: An Ensemble 3D Alignment Method in Application to 3D CT-MRI Fusion and 3D Brain Mapping.
- **Sepuluh Nopember Institute of Technology** — Surabaya, Indonesia
  Bachelor of Computer Science; GPA: 3.64/4.00 — *August 2010 - March 2014*
  Thesis Title: Implementation Image Edge Detection Based on Sub-pixel of Partial Area.

Skills Summary

- **Languages**: C, C++, C#, Python, Java.
- **Deep Learning**: Diffusion Model, Image and Video Generation, Image and Video Classification.
- **Deep Learning Tools**: Pytorch, Tensorflow.

Research Interests

- **Machine Learning**: Image and Video Generation, Trajectory prediction, Homography transformation.
- **Health-care**: Multimodal Image Registration, Neuron Tracing.
- **Industrial Applications**: Autonomous vehicles, Supply chain management, IoT

Current Status

Citizens of Indonesia

Teaching Experience

- **Bachelor's Degree**: Probability and Statistics, Discrete Mathematics, Multivariate Data Analysis, Automata.
- **Master's Degree**: Time Series, Multivariate Data Analysis.

Supervising Experience (Suplementary Materials)

- **Bachelor's Degree**: Image captioning in indonesian using transformer method; Relative speed estimation using object removal in optical flow; Implementation of bird's eye view on vehicle dashcams for road environment analysis.
- **Master's Degree**: Tune-a-video using dual attention in text-to-video applications for semantic editing; Prediction of macroeconomic indicator movements on credit risk based on climate change; Monthly rainy season prediction in Tanjungpinang city using a combination of stacking ensemble learning and feature selection; Wind speed prediction based on hybrid decomposition iceemdan-ewt-bilstm as supporting information for strong wind early warning system.

Experience

- **Sepuluh Nopember Institute of Technology** — Surabaya, Indonesia
  Assistant Professor — *February 2024 - Current*
  - **Research and teaching**: My current responsibilities include researching data collection and video synthesis on autonomous vehicles, supervising undergraduate and graduate students, and teaching international and local undergraduate and graduate students classes such as probability and statistics, numerical methods, automata and time series. Through these roles, I contribute to handling short program events and leading discussions on international forums.
- **National Institute of Information and Communications Technology** — Tokyo, Japan
  Researcher — *October 2021 - January 2024*
  - **Research and Development**: Designing and implementing an unsupervised learning algorithm to detect and predict traffic near-miss accident videos.
  - **Collaboration with Companies engaged in Transportation**: Leading software engineering teams to deploy the prediction model of traffic near-miss accidents to the systems of our collaboration company engaged in transportation to overcome the results of their competitors.

Academic Projects

- **Traffic near-miss incident dataset annotation**: Collecting and annotating traffic near-miss accident videos from different countries, where the focus is on annotating near-miss and accident videos that involve other object participants alongside the ego vehicle.
- **Traffic Near-Miss Accident Detection and Prediction**: Proposing near-miss accident detection using the safety distance between the ego-vehicle and other object participants as the parameters to define near-miss events without training data, where it can show that the proposed system can run automatically and detect very well in the real environment.
- **3-Dimensional Image Registration**: Developing a new ensemble approach in image registration that improves the performance of individual methods. The proposed method is tested with two data types: multi-modality alignment of 3D CT and MRI datasets, and super-high-resolution Drosophila brain mapping. Based on the paired-sample T-test, the results show that the proposed method is significantly better than the benchmark approaches for the CT-MRI human and the Drosophila brain datasets.
- **Neuron Tracing**: Developing automatic ensemble neuron tracers that consistently perform well on 57 datasets from 5 species, collected from 7 laboratories worldwide. Based on the quantitative evaluation, the proposed ensemble tracers are valuable for 3-dimensional neuron tracing and can be widely applied to different datasets.

Selected Peer-Review Journal and Conference Papers

- Sierra, E.; Delenia, E.; Haryono, A.T.; and Sarno, R.; **Pradana, H.**; and Purwitasari, D.; Clustering-Based and Multicollinearity Feature Selection in Macroeconomic Indicators for Predicting Loan Losses. International Journal of Intelligent Engineering & Systems, 18, 8, 2025.
- Dao, M.S; **Pradana, H**; Zettsu, K. MM-TrafficRisk: a video-based fleet management application for traffic risk prediction, prevention, and querying, 2023 IEEE International Conference on Big Data (BigData).
- **Pradana, H.** An End-to-End Online Traffic-Risk Incident Prediction in First-Person Dash Camera Videos. Big Data Cogn. Comput. 2023, 7, 129. https://doi.org/10.3390/bdcc7030129.
- Huddiniah, E.R.; **Pradana, H.** Impacts of Product Variety and Supply Chain Networks on the Influx of Information Exchange in Industry Applications. Smart Cities 2023, 6, 1059-1086. https://doi.org/10.3390/smartcities6020051
- **Pradana, H.**; Dao, M.S; Zettsu, K, Augmenting Ego-Vehicle for Traffic Near-Miss and Accident Classification Dataset using Manipulating Conditional Style Translation, 2022 Digital Image Computing: Techniques and Applications (DICTA), 2022.
- Hamza, R.; **Pradana, H.** A Survey of Intellectual Property Rights Protection in Big Data Applications. Algorithms 2022, 15, 418. https://doi.org/10.3390/a15110418
- **Pradana, H.**; Horio, K. Automatic Controlling Fish Feeding Machine using Feature Extraction of Nutriment and Ripple Behavior. International Journal of Innovative Computing, Information and Control (IJICIC) (2021). https://doi.org/10.24507/ijicic.17.05.1483.
- **Pradana, H.** and Horio, K., "Tuna Nutriment Tracking using Trajectory Mapping in Application to Aquaculture Fish Tank," 2020 Digital Image Computing: Techniques and Applications (DICTA), 2020, pp. 1-8, doi: 10.1109/DICTA51227.2020.9363387.
- Wang, CW.; Lee, YC.; **Pradana, H.** Ensemble Neuron Tracer for 3D Neuron Reconstruction. Neuroinform 15, 185–198 (2017). https://doi.org/10.1007/s12021-017-9325-1.

Peer Review Activities

Multimedia Tools and Applications, International Conference on Multimedia Modeling, International Conference on Digital Image Computing: Techniques and Applications, KSE - The International Conference on Knowledge and Systems Engineering, Frontiers in Big Data, International Conference on Neural Information Processing (ICONIP).

Honors and Awards

- **Research Grants**: Receiving over 100 milion IDR for internal research fund from ITS (supported document).
- **Scholarship Award**: Monbukagakusho/MEXT Scholarship in 2018.
- **Research Funding**: Ministry of Science and Technology, Taiwan, with grant number: MOST-105-2221-E-011-121-MY2
- **National Finalist**: Data Mining competition at Bandung Institute of Technology in October 2013