FITRIA WULANDARI

PhD Candidate in AI and ML - Genetic Programming, Symbolic Regression, Optimisation, Synthetic Data, Model Interpretability

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SUMMARY

PhD candidate (final year) in Artificial Intelligence with a focus on interpretable machine learning, symbolic regression, and evolutionary optimisation. Experienced in collaborative research, algorithm development/customisation, and synthetic data generation.

RESEARCH EXPERIENCE

PhD Researcher

University of Galway | Science Foundation Ireland Centre for Research Training in Artificial Intelligence (*SFI CRT-AI*)

📅 October 2021 – Ongoing   ⚲ Galway, Ireland

- Developing interpretable models using symbolic regression and genetic programming, focusing on transparent and generalisable model structures.
- Designing synthetic data generation methods to evaluate model robustness and improve generalisation under limited or biased data conditions.
- Exploring evolutionary computation techniques to optimise both model architecture and learning pipelines.
- Investigating algorithm customisation frameworks to adapt symbolic and generative methods to domain-specific constraints.
- Designing metrics to help make decisions by balancing how well models perform and how easy they are to understand.
- Publishing research in peer-reviewed venues and contributing open-source tools for symbolic modelling and automated machine learning.

Research Visiting

University of Applied Science Upper Austria | (*HEAL Lab*)

📅 1st April 2024 – 5th July 2024   ⚲ Hagenberg, Austria

- Built extrapolation models via knowledge distillation and synthetic data.
- Design metrics that support decision-making by balancing model performance and interpretability.
- Collaborating on extrapolation models using knowledge distillation and synthetic data.

Research Assistant

Kyungpook National University | *ECIS Lab*

📅 February 2018 – March 2020   ⚲ Daegu, South Korea

- Developed coverage path planning algorithms for autonomous greenhouse farming robots (*paper link*).
- Applied Differential Evolution (DE) algorithms to optimise the interactive interior design (*paper link*).

EDUCATION

Ph.D. Artificial Intelligence

University of Galway

📅 Oct 2021 – Ongoing   ⚲ Ireland

Research: Hybrid Evolutionary and Neural Program Synthesis for Artificial Intelligence

M.Sc. Electronics Engineering

Kyungpook National University | *GPA 3.88/4.30*

📅 Feb 2018 – Feb 2020   ⚲ South Korea

Thesis: Evolutionary Multi/Many-objective Approaches for Next Release Optimization Problem

B.Sc. Informatics Engineering

University Harapan Medan | *GPA 3.49/4.00*

📅 Sep 2010 – Jul 2014   ⚲ Indonesia

Project: Development of a Web-Based Project Management Platform using Waterfall Technique

TECHNICAL SKILLS

Programming and Scripting

Python, TensorFlow, PyTorch, Matlab, C++, C#, PhP, SQL, JavaScript

Software and Platform

Microsoft Visio, Android Studio, Visual Studio, Eclipse, Adobe Photoshop, Adobe Illustrator, Adobe Dreamweaver, Linux, Mac, Windows, MS Word, Excel, Powerpoint, LaTex, Github

Related Research

Single-objective and Multi-objective Optimization, Regression, Genetic Programming, Symbolic Regression, Statistical Analysis, Data Synthesis, Data Augmentation, Knowledge Distillation, Transfer Learning, Convex Hull, Kernel Density Estimation

- Developed a novel many-objective evolutionary algorithm using hierarchical Pareto-dominance for complex optimisation problems (*paper link*)
- Conducted Master's thesis research on evolutionary multi/many-objective optimisation for the Next Release Problem (Software Updates), using algorithms such as NSGA-II, ISDE+, and IBEA (*thesis link* and *slides link*).

Research Assistant

Kyungpook National University | *Artificial Intelligent Robot (AIR) Lab*

📅 August 2016 – March 2017 　　📍 Daegu, South Korea

- Built Arduino-based obstacle detection for cleaning robot

INDUSTRY EXPERIENCE

Backend/Web Developer

Radfi Startup, MAT Arsitek, Parental Institute

📅 2010 – 2016 　　📍 Medan, Indonesia

- Built full-stack web system in PHP, MySQL, and Java.
- Designed APIs and database schemas to support scalable and efficient product features.
- Collaborated on UI/UX with frontend teams.
- Participated in project planning and agile development cycles, adapting quickly to changing requirements in a fast-paced startup environment.

PUBLICATIONS

📄 Journal Articles

- A. Fajar, R. Trialih, and **F. W. Ramlan**, "A decentralized file storage for effective e-government," *Indonesia Post-Pandemic Outlook: Environment and Technology Role for Indonesia Development*, p. 279, 2022.
- D. D. Uyeh, **F. W. Ramlan**, R. Mallipeddi, *et al.*, "Evolutionary greenhouse layout optimization for rapid and safe robot navigation," *IEEE Access*, vol. 7, pp. 88 472–88 480, 2019.

- **F. W. Ramlan**, and J. McDermott, 2023, September. "Genetic Programming with Synthetic Data for Interpretable Regression Modelling and Limited Data". In *International Conference on Machine Learning, Optimization, and Data Science* (pp. 142-157). Cham: Springer Nature Switzerland. (*paper link*)
- **F. W. Ramlan**, C. O'Riordan, G. Kronberger, and J. McDermott, 2025, July. "Can Synthetic Data Improve Symbolic Regression Extrapolation Performance?". In *The Genetic and Evolutionary Computation Conference*. Accepted in GECCO 2025 (*link*)
- **F. W. Ramlan**, G. Kronberger, C. O'Riordan, and J. McDermott, 2025, October. "Comparative Analysis of Model Selection Criteria for Symbolic Regression Using Genetic Programming". In *17th International Conference on Evolutionary Computational Theory and Applications*. Accepted in ECTA 2025 (*link*)

TRAINING

- Machine Learning | University of Limerick
- Computer Vision | Dublin City University
- Constraint Programming | University College Cork
- Reinforcement Learning and Recommended Systems | Trinity College Dublin
- Natural Language Programming | University of Galway

PRESENTATIONS

- **Seminar**: "Multi-agent Systems for Thermal Comfort and Energy Efficiency", CESLeA Workshop, Kyungpook National Univ., South Korea, 2018.
- **Conference**: "Interior Design Recoloring via Differential Evolution and YUV Edge Detection", ICTC 2019, Jeju, South Korea.
- **Conference**: "Hierarchical Evolutionary Algorithm for Many-Objective Optimization", ICAISC 2019, Seoul, South Korea.
- **Conference**: "Genetic Programming with Synthetic Data for Interpretable Regression", LOD 2023, UK.
- **Conference**: "Can Synthetic Data Improve Symbolic Regression Extrapolation Performance?", GECCO 2025, Spain.

AWARDS

- CRT-AI PhD Scholarship | 2021 - Ongoing
- NRF South Korea | 2018 - 2020
- KNU Intl. Scholarships | 2018 - 2020
- Brain Korea 21 (BK21) | 2018 - 2020

REFERENCE

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