

# Jingeun Kim

Wlsrms27@gachon.ac.kr

1342 Seongnam-daero, Sujeong-gu, Seongnam-si, Gyeonggi-do, Republic of Korea  
+82) 10-5768-8181

## RESEARCH INTERESTS

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My research primarily focuses on developing efficient machine learning frameworks. Specifically, I aim to explore efficient models using neural architecture search based on genetic algorithms. Furthermore, I am currently working on model compression, particularly pruning, using genetic algorithms for CNN-based models and pre-trained models.

**Keywords:** Neural Architecture Search, Genetic Algorithm, Model Compression

## EDUCATION

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Doctor of Philosophy:

Gachon University, Gyeonggi-do, South Korea (Mar. 2024 - )

Major in IT Convergence Engineering (Advisor: Yourim Yoon)

Master of Science:

Gachon University, Gyeonggi-do, South Korea (Sep. 2021 - Aug. 2023)

Major in IT Convergence Engineering (Advisor: Yourim Yoon)

4.06/4.50 GPA

Thesis title: Machine Learning with Various Feature Selection Methods for Diagnosis of Parkinson's Disease Using RNA-Seq

Bachelor of Science:

Gachon University, Gyeonggi-do, South Korea (Mar. 2016 - Aug. 2021)

Major in Computer Engineering (Advisor: Yourim Yoon)

3.73/4.50 GPA

## WORK EXPERIENCES

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Gachon University

Sep 2023 – Feb 2024

Master's Degree Researcher

- Optimization of DenseNet architecture using a genetic algorithm with multi-dimensional encoding scheme

## PROJECTS

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Project 1 (May 2020 - May 2021)

**Analysis of Pulmonary Diseases Induced by Fine Particulate Matter and Treatment Drug Screening Using Meta-Heuristic-Based Feature Selection Algorithm**

Summary: This study compares how machine learning is efficient when classifying mRNAs or miRNAs.

Role: model implementation, evaluation, interpretation, and manuscript writing

Advisor: Yourim Yoon

Status: Paper accepted

Project 2 (Mar. 2021 - Nov. 2021)

**Development of Next-Generation Battery Management System (BMS) with AI-Based Fire and Explosion Prevention for Lithium-ion Batteries**

Summary: Estimate the resistance value of the battery cell after 10 days to prevent explosion and Battery anomaly detection using clustering.

Role: Researcher (model implementation, evaluation)

Advisor: Taegkeun Whangbo

Status: Paper accepted

Project 3 (May 2021 - May 2022)

**Theory and Applications of Various Feature Selection Algorithms**

Summary: This study uses EEG datasets and genetic algorithms to select meaningful features to increase the accuracy of machine learning.

Role: Overall study design, model implementation, evaluation, interpretation, and manuscript writing

Advisor: Yourim Yoon

Status: Manuscript submitted

Project 4 (May 2022 – Present)

**Research on IT-BT/ET Convergence Technology Using Meta-Heuristic-Based Feature Selection Algorithms**

Summary: Various feature selection methods improve the performance of machine learning when classifying Parkinson's disease

Role: Overall study design, model implementation, evaluation, interpretation, and manuscript writing

Advisor: Yourim Yoon

Status: Paper accepted

Project 5 (May 2023 - Present)

**Healthway Development for Senior Citizens in the Age of Homo sapiens [Re:]Solution: Building a Healthway for Muscle Atrophy Prevention and Management**

Summary: Enhancing classification accuracy through feature selection using correlation analysis

Role: Overall study design, model implementation, evaluation, interpretation, and manuscript writing

Advisor: Yourim Yoon

Status: Manuscript writing

Project 6 (Jan 2024 - Present)

**AI-based Maritime Search and Rescue Decision Making**

Summary: This study utilizes AI to improve real-time data analysis, predictive modeling, and resource optimization, enhancing the efficiency and effectiveness of maritime SAR operations.

Role: Overall study design, model implementation, evaluation, interpretation, and manuscript writing

Advisor: Yourim Yoon

Status: Work in progress

## PUBLICATIONS

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- J3. Improving Modularity Score of Community Detection Using Memetic Algorithms  
Dongwon lee, **Jingeun Kim**, Yourim Yoon  
AIMS mathematics
- J2. RNA Sequences-Based Diagnosis of Parkinson's Disease Using Various Feature Selection Methods and Machine Learning  
**Jingeun Kim**, Hyejin Park, Yourim Yoon  
Applied Sciences 2023 [IF: 2.838]
- J1. Comparative Study of Classification Algorithms for Various DNA Microarray Data  
**Jingeun Kim**, Yourim Yoon, Hyejin Park, Yong-hyuk Kim  
Genes 2022 [IF:4.141]

## CONFERNCES

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- C3. Efficient Pruning of DenseNet via a Surrogate-Model-Assisted Genetic Algorithm  
**Jingeun Kim**, Yourim Yoon  
GECCO 2024
- C2. Genetic Algorithm-based Pruning for Efficient DenseNet Architecture  
**Jingeun Kim**, Yong-hyuk Kim, Yourim Yoon  
International conference on artificial intelligence in information and communication (ICAIIIC) 2024
- C1. the battery risk prediction method using the deep learning  
Kyunam Choi, Mona O, **Jingeun Kim**, Taegkeun Whangbo  
ITC-CSCC 2021

## DOMESTIC PUBLICATIONS

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- J1. Battery thermal runaway cell detection using DBSCAN and statistical validation algorithms  
**Jingeun Kim**, Yourim Yoon  
The Journal of the Convergence on Culture Technology 2023 (In Korean; KCI)

## MANUSCRIPTS UNDER REVIEW AND IN PREP

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- J3. Pruning for Efficient DenseNet via Surrogate-Model-Assisted Genetic Algorithm considering NAS Proxies  
**Jingeun Kim**, Yourim Yoon  
Prepared for submit to IEEE TEVC
- J2. A Study on the Effectiveness of Feature Selection considering mRMR across Different Datasets  
**Jingeun Kim**, Yourim Yoon  
Prepared for submit to Information Processing & Management
- J1. Performance Analysis and Improvement of Machine Learning with Various Feature Selection Methods for EEG-Based Emotion Classification  
Sherzod Abdumalikov, **Jingeun Kim**, Yourim Yoon  
Submitted to Applied Sciences

## TEACHING EXPERIENCE

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- 2024 Spring** Algorithm @Gachon University (T.A.)
- 2023 Fall** Discrete mathematics @Gachon University (T.A.)

<b>2023 Spring</b>	Advanced Programming @Gachon University (T.A.)
<b>2022 Fall</b>	Algorithm @Gachon University (T.A.)
<b>2022 Spring</b>	Discrete mathematics @Gachon University (T.A.)
	Algorithm @Gachon University (T.A.)

#### **AWARDS, HONORS & SCHOLARSHIPS**

2021-2023	Tuition Exemption (100%), Educational Funding Scholarship @Gachon University	4500\$
2022	SCI best paper award @Gachon University	100\$
2020	Gachon University x-design contest 3 <sup>rd</sup> place @Gachon University	200\$
2016-2021	Tuition Exemption (30%), Educational Funding Scholarship @Gachon University	1000\$

#### **PROFESSIONAL SERVICE**

Journal Reviewer	BMC Psychiatry, Discover Oncology
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#### **SKILLS**

Programming Languages	Python, JAVA
AI Frameworks	Pytorch, Tensorflow, sklearn, pandas, numpy
Languages	Korean (Native), English (Intermediate)

#### **REFERENCES**

Advisor	Prof. Yourim Yoon yryoon@gachon.ac.kr
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