Doyeol Oh

Undergraduate Researcher | Full-Stack Developer

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Research Interest

My research interest centers on modeling how humans interact with the world — so that intelligent agents can learn to do the same. The two methods closest to that question, in my view, are RLHF and robotics: RLHF turns "what people want" into a supervisory signal that anchors an agent in our intent, while robotics treats the body as the medium where interaction is pressure-tested against physics. Adjacent to this core sit three problems: Video Understanding (input), HCI (interface), and Safe AI (responsibility). On the long horizon, all five meet at AGI.

Education

Ulsan National Institute of Science and Technology (UNIST) Mar 2021 – Present

B.S. in Computer Science and Engineering. GPA: 4.05 / 4.30.

Korea Advanced Institute of Science and Technology (KAIST) Mar 2026 – Present

Exchange Student, School of Computing.

University of Auckland — English Language Academy Jan 2025 – Feb 2025

Certificate in Advanced English (C1).

Experience

Peulda Co., Ltd. Jan 2026 – Present

Software Developer. Frontend, deploying UX-aware services with AI-assisted workflows.

UNIST DM Lab (Prof. Junghoon Kim) May 2025 – Nov 2025

Undergraduate Researcher. Graph clustering on location-based social networks; first-author KDBC 2025 paper and KR patent application.

UNIST DECS Lab (Prof. Hui-sung Lee) Jan 2022 – Dec 2022

Embedded Software Developer. Designed steering control for an indoor mobility prototype; ICROS 2024 paper.

Publications

Author marked in **bold**.

Capture-the-Flag Pacman with Self-Play Tuned Heuristics May 2026

KAIST Introduction to Artificial Intelligence, Assignment 3 (Pacman Competition Award)

Doyeol Oh

A two-vs-two CTF Pacman team built on classical search (goal-commit A* offense, alpha-beta minimax defense,

42-feature linear evaluator) plus a held-out verification protocol designed to defeat zoo-overfitting. The contribution is treating the student round-robin as an unseen distribution head-on, generalizing via hand-inspectable weights and external anchors instead of deep RL. 40/40 official; 77.1% over a 792-game external SOTA sweep.

Multi-Agent Search for Pacman: Reflex, Minimax, and Alpha-Beta Apr 2026

KAIST Introduction to Artificial Intelligence, Assignment 2

Doyeol Oh

An analysis that disentangles three commonly-conflated effects in adversarial Pacman: action ordering has two dimensions (pruning efficiency vs. tie-breaking), minimax is brittle against random ghosts via pessimism cascade rather than evaluation quality, and on trapped layouts the -1 living penalty creates a "swift-death preference" that makes deeper search rush a ghost.

Graph Search for Pacman: DFS, BFS, UCS, and A* Mar 2026

KAIST Introduction to Artificial Intelligence, Assignment 1

Doyeol Oh

DFS / BFS / UCS / A* on the CS188 framework, plus a custom admissible heuristic (Blockage Detection + Tarjan articulation-point Portal Detection + dead-end peeling) that expands 34.4% fewer nodes than Manhattan on average. Per-call preprocessing made wall-clock time worse for single queries — a clean illustration of the search-quality vs. evaluator-cost tradeoff.

SKiP: SVM Weighted by K-Nearest-Neighbors and Class Probability for Weakening Outliers Dec 2025

UNIST Machine Learning, Final Project Report

Doyeol Oh, Jeonghoon Park, Jaemin Kim, KangJun Lee

A weighted soft-margin SVM with slack penalty $C_i = C \cdot (p_i + n_i)/2$, where p_i is a class-conditional Gaussian probability (catching feature outliers) and n_i is a KNN label-consistency score (catching label outliers). The novelty is the additive aggregation: a multiplicative form collapses when either signal breaks, while the average lets the surviving signal carry the weight.

Entropy-Guided Adaptive Label Propagation for Location-Aware Graph Clustering Nov 2025

Korean Database Conference (KDBC) 2025

Doyeol Oh*, Hyewon Kim*, Dahee Kim, Junghoon Kim†

An adaptive label propagation for LBSN where each node's structural-vs-spatial weight is $\alpha = 1 - H/\log|L|$, derived from the entropy of its neighbor labels. When neighbors agree, the Jaccard structural term dominates; when they disagree, the Haversine spatial term takes over.

Hylos: Hierarchically Localized Optimization Strategy for TSP Jun 2025

UNIST Introduction to Algorithms, Assignment 2 (Best Paper Award)

Doyeol Oh

A four-stage hierarchical TSP solver: k-means partitions cities into clusters of size ≤ 22 so Held–Karp becomes feasible, then both inter-cluster and intra-cluster tours dispatch by size between Held–Karp and Christofides, with a final entry/exit alignment to minimize cluster-boundary transitions. On mona-lisa100k, $\sim 8\times$ faster than Christofides at $\sim$2% lower cost.

Comparative Study of Twelve Sorting Algorithms Apr 2025

UNIST Introduction to Algorithms, Assignment 1 (Best Paper Award)

Doyeol Oh

A C++ benchmark of twelve sorts across random / sorted / reverse / partial inputs from 10^3 to 10^6. Two findings worth keeping: vanilla Lomuto Quick crashes on sorted input from unbalanced recursion (median-of-three pivoting is practically required), and a naive multithreaded Tim variant ran slower than single-threaded Tim because thread-creation overhead dominated the merge gain.

Development of Intuitive Steering Mechanism for Hands-Free Operation of Indoor Shared Mobility Jul 2024

ICROS (Institute of Control, Robotics, and Systems) 2024

Donghoon Nam, **Doyeol Oh**, Seongjae Lee, Yunjeong Gwak, Hui-sung Lee

A chair-shaped indoor mobility with hands-free steering: a potentiometer reads saddle rotation and an STM32F303RE drives a PID-controlled steering motor; the throttle is replaced by a kick-to-start scheme.

Patents

System and Method for Spatially Proximate Community Detection Based on Entropy-Weighted Adaptive Label Propagation Feb 2026

KR 10-2026-0027653 (filed 2026-02-11).

Selected Projects

Skelly Clash — Toss HTML5 Game Challenge Sep 2025 – Dec 2025

3D roguelike survival action game running natively in the browser. Wave-based skeleton enemies, OOP-driven game loop, leveling. Featured in the Toss app game tab; deployed via Vercel.

ER:ight? — 3rd Digital Healthcare Hackathon Nov 2025

AI platform for emergency-room suicide-attempt patients. Fills the 138-min average wait with CBT-based AI counseling (text and voice) and delivers CAMS summaries to medical staff.

$\geq$kim-i — 2025 kakao $\times$ goorm Season-thon Sep 2025

Eco-campaign service that visualizes generative AI's CO_2 footprint and proposes walking challenges to offset it. Real-time GPS step tracking via Flutter Geolocator. Co-led with Sujin Yoon and Junun Kim.

Fruit Box Bot — Personal Mar 2025 – Apr 2025

Bot that recognizes apple-game numbers on screen, solves the puzzle, and operates the mouse. Gameplay video went viral on Instagram (250k views, 7k shares, 4k likes).

Gyeonggi Youth Ladder Program — Branding Page Jan 2025

Web service to establish program identity and archive 1st-cohort activities (personal missions, portfolios). UI inspired by Toss and Hour-express — minimalist, readable.

Military Welfare Map Jul 2023 – Jul 2024

Web service that integrates scattered military welfare information into a map-based UI for soldiers and their families. Includes location-based discount visualization and an AI chatbot "GPT Sergeant" for conversational access. *Minister of Defense Award, 2024 National Defense Public Data Competition.*

rokaf.click — popcat.click for ROKAF units Nov 2023 – Jan 2024

Click-counting site for Republic of Korea Air Force units, modeled after popcat.click's country competition.

YoungCHA — Hands-Free Indoor Mobility (BTS Research Program) Mar 2022 – Dec 2022

Chair-shaped indoor mobility with hands-free steering: rotate the saddle to turn, kick to start. Co-lead with Seongjae Lee. Published as ICROS 2024.

Awards & Honors

Minister of Defense Award — 2024 National Defense Public Data Competition Jul 2024

Ministry of National Defense, Republic of Korea. "Military Welfare Map" (Service Development).

Best Paper Award — UNIST Introduction to Algorithms Jun 2025

For *Hylos: Hierarchically Localized Optimization Strategy for TSP*.

Pacman Competition Award — KAIST Introduction to Artificial Intelligence May 2026

For the Capture-the-Flag Pacman team. Won 40/40 official games.

Gold & Bronze Prize, U-Challenge / X-Corps Plus Festival Nov 2022

UNIST BTS (BrainToSociety) Research Program, "YoungCHA".

Top Team & Top Participant — OUTTA AI Bootcamp (1st cohort) Aug 2022

1st of 27 teams; 5th of 61 participants.

National Excellent Scholarship (STEM) Mar 2021 – Present

Korean government merit-based scholarship.

Activities & Programs

Mentor — CSE Mentor-Mentee Program (UNIST) Sep 2025 – Dec 2025

Selected as 1st-place team.

White Hacker Training Program — Ulsan Information Industry Promotion Agency Aug 2025

1st-place team in final CTF competition.

Frontend Devlopment Instructor — 9roomthonUNIV (goorm × UNIST) Mar 2025 – Jun 2025

Technical Skills

Frontend: React, Next.js, Styled-components, Tailwind CSS
Mobile: Flutter, React Native
Infrastructure: Vercel, Supabase, Google Cloud Platform
Embedded: C, MBED, Arduino, Raspberry Pi
AI / ML: NumPy, PyTorch, Gymnasium
Tooling: Git, Docker, Figma, Notion, Linear, Claude Code, Vim