Kyoungmin Roh

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Summary

Cybersecurity undergraduate specializing in AI-based malware detection and secure system design. The first author of an SCI Q1-level paper under review, with hands-on experience in adversarial ML, concept drift mitigation, and Android reverse engineering. Actively engaged in CTFs and collaborative research projects. Seeking to advance security research through international graduate studies and lab contributions.

Education

Dankook University

Mar 2021 – Present

- Bachelor of Cybersecurity
- Undergraduate (Currently Junior – 3rd grade)
- Expected Graduation: Feb 2027
- GPA: 2.83/4.5

Scholarship

- Dankook University, Department of Cybersecurity Specialized Scholarship (2022-1)

Research Interest

- Vulnerability Analysis
- Vulnerability Detection using Artificial Intelligence
- AI for Malware Analysis and Detection
- Machine Learning
- Mobile Security
- Android Reverse Engineering
- Android Malware Detection

Publications (SCI Papers Only)

Under Review

1. K. M. Roh, S. M. Lee, S. J. Cho, Y. S. Hwang, and D. J. Kim, “Improving Long-term Robustness in Android Malware Detection with Fixed GMM clustering and Adaptive Thresholding”, Computers & Security (2025)

Submitted as the first author after leading the entire research process, including design, experimentation, and writing. Co-authors provided some ideas and feedback. Currently under review.

Posters

Under Review

1. K. M. Roh, J. H. Kim, and M. S. Seong, “AI-powered QR Phishing Detection and Secure QR generation” (2025)

Presented a poster on secure QR codes using HMAC signatures and AI phishing detection.

Patents

Under Review

1. K.M. Roh, S. M. Lee, and S. J. Cho, “A Malware Detection Method Combining Clustering and Supervised Learning Models” (2025)
- Korea Application P2025141

The invention interview is scheduled for June 25, 2025.

Research Experiences

Research Intern

Mar 2025 – Present

- At CSOS LAB, Department of Software Science, Dankook University.
- Supervisor: Prof. Sungje Cho
- Studying Android Malware Detection using Machine Learning.
- Developing Digital Forensic tools for vehicles

CTF Participation

HACKSIUM BUSAN 2025 Preliminaries

28 Jun 2025

- **Qualified for finals**, ranked 26th out of all participating teams.
- Contributed to the team by solving three web and cryptography problems.
- Participated as **the leader of the team**.
- Review & Writeups: https://medium.com/@kyoungminroh01/list/hacksium-busan-2025-1e9a0a91fc6b

BYUCTF 2025

17 May 2025 – 18 May 2025

- 270th/1074th
- Contributed to the team by solving six reverse engineering, cryptography, and misc problems.
- Writeups: https://medium.com/@kyoungminroh01/list/byuctf-2025-7c62b2540794

HacktheOn Sejong CTF 2025 Preliminaries

26 Apr 2025

- 42nd/401st (top 10%)
- Participated in the CTF as the team named "고졸 사토루".
- Contributed to the team by solving two reverse engineering and forensic problems.
- Review & Writeups: https://medium.com/@kyoungminroh01/list/hacktheon-sejong-2025-ctf-d42d93286e14

squ1rrer CTF 2025

6 Apr 2025 – 7 Apr 2025

- 75th/528th
- Contributed to the team by solving three Web and Misc CTF problems.

Security Projects

In Process

Automatic Analysis Digital Forensic Tool for Hyundai Avante (CN7)

Jun 2025

- Developing a digital forensic toolkit targeting the Hyundai Avante (CN7) IVI system running KitKat Android OS. The tool enables reliable acquisition and in-depth analysis of events and system logs generated from voice commands and touch

interactions within the vehicle infotainment system.
- GitHub: https://github.com/bogamie/Log

Finished Project

ASX: Android API Sequence Extractor

Jun 2025

- Static Android APK analyzer designed to extract method-level API call sequences from DEX files.
- Supports multi-instance learning (MIL) by producing multiple API sequences per APK, each corresponding to an individual method.
- For each method in the APK, the tool extracts invoked API calls using DEX-level invoke-* instructions.
- The API calls are abstracted at the class level.
- After the API sequences are extracted, the tool automatically filters out trivial methods based on name and class prefixes, retaining only the top 30 most extended and most meaningful API sequences to minimize noise and sequence overload.
- Developed as a modern, desktop-style interface using Electron, HTML, CSS (with Tailwind-like aesthetics), and JavaScript.
- GitHub: https://github.com/rohkyoungmin/api-sequence-extractor-gui

Qrust: Secure QR code Generation and AI-based QR phishing Detection App

Mar 2025 – Jun 2025

- Developed a mobile app using Flutter to scan and generate QR codes securely.
- Integrated a phishing URL classifier using a Flask-based QR phishing detection AI model. (https://medium.com/@kyoungminroh01/building-a-phishing-url-detection-api-with-machine-learning-and-flask-9f2ae7e4af59)
- Applied HMAC-based digital signature to prevent QR code overlay attacks and ensure the authenticity of generated QR codes.
- Designed full UI/UX architecture and led frontend app implementation, and developed Security modules (HMAC digital signature, QR phishing Detection AI).
- GitHub: https://github.com/dku-capstone
- Figma: https://www.figma.com/design/FUL9wnutOItFlhYGhWkHls/DKU-Security-Capston?node-id=0-1&t=1qipRtv6bdA50Byw-1

Post-Quantum Signature System: Lamport + Merkle Tree

Aug 2023 – Sep 2023

- Implemented a quantum-resistant digital signature scheme using Lamport one-time signature and Merkle tree structure in Python.
- Simulated key generation, signing, and verification processes.
- Demonstrated potential applicability of hash-based signatures in post-quantum cryptographic systems.
- **Awarded First Prize** in a university cryptography competition sponsored by the National Intelligence Service (NIS).
- GitHub: https://github.com/rohkyoungmin/Post-Quantum-Signature-System

Development Projects

AIRO: LLM-based Parenting Assistance App

May 2025 – Jun 2025

- Designed a secure and intelligent parenting assistant mobile app to address information fragmentation, emotional isolation, and emergency response deficiencies in early childcare.
- Integrated Meta LLaMA 3 as the generative AI for real-time parenting guidance, symptom assessment, and daily routine automation.
- Led all processes as **the leader of the team**.
- Figma: https://www.figma.com/design/3qMwPXeXMMzIVACfhiIu6N/SW-%EC%9C%B5%ED%95%A9%EB%8C%80%ED%95%99-%EA%B2%BD%EC%A7%84%EB%8C%80%ED%9A%8C?node-id=0-1&t=85Qj0UhCSOHCmaO7-1

Selenium-based Web Crawling Script

Apr 2025

- Developed a selenium-based web crawling Python script that crawls the product reviews from 오늘의집(Today's House).
- Contributed to an LLM-based research project at another university's design lab by developing a Selenium-based web crawler.
- GitHub: https://github.com/rohkyoungmin/web_crawling

Deep Learning-based Agricultural Pest Detection Model

Nov 2024

- Designed a CNN-based image classification model to detect pest damage in crop images captured by standard cameras.
- Applied image preprocessing and data augmentation (resize, rotate, crop, brightness adjustment).
- GitHub: https://github.com/rohkyoungmin/smart-greenhouse-disease-detector

Extracurricular Trainings

LG Aimers AI Bootcamp & Hackathon

Jan 2023 – Feb 2023

- Completed a competitive AI training program focused on real-world industrial applications.
- Developed a defect classification model for smart factory products; **ranked top 30% in final evaluation**.
- Successfully coordinated task allocation and model design as a **leader of the team**.

Extracurricular Experiences

Member of Aegis

2021 Mar – Present

A software development and cybersecurity club at Dankook University.

- Aegis Cybersecurity team member
- Aegis CTF team member
  - Participated in Several CTFs as a team.

Running a Tech Blog

2025 Apr – Present

Running a personal technology blog that covers topics related to AI, cybersecurity, and software development.

Blog URL: https://medium.com/@kyoungminroh01

Awards

Cryptography Competition

Sep 2023

- Awarded by the Department of Cybersecurity, Dankook University.
- Awarded First Place Prize

Certifications

Language

- TOEIC: 870

Technical Skills

- High: Can develop independently and solve real-world problems.
- Mid: Can build standard features with some guidance.
- Low: Understands basics; limited to simple tasks.

Programming

- Python – Mid-High
- Java – Low
- C/C++ - Mid

Security

- Web/Mobile Hacking – Low
- Cryptography – Low
- Reverse Engineering – Mid

Artificial Intelligence

- Data Analysis – Mid
- Machine Learning – Mid-High

- Deep Learning – Mid
- LLM fine tuning – Low
- Google Colab
- Kaggle
- Jupyter Notebook

Mobile Development

- Flutter – Mid
- Kotlin – Low
- React.js – Low
- Android Studio

Web Development

- JavaScript – Low
- CSS – Low
- HTML – Low

Backend

- Flask – Mid

Design

- Figma – High
- Adobe Photoshop – Mid

Communication

- Notion
- Discord
- GitHub

Military Service

KATUSA (Korean Augmentation to the U.S. Army)

7 Aug 2023 – 6 Feb 2025

- U.S. 8th Army, Camp Carroll, South Korea
- 35th Brigade, 2-1 Air Defense Artillery Battalion, Echo Company
- Served as interpreter and liaison for joint U.S.–ROK operations, enabling cross-cultural communication and mission support.
- Demonstrated strong adaptability, discipline, and accountability in a high-security military environment.
- Got a Battalion-level Environmental Officer Certification.
- **Won the Battalion-level Best Warrior Squad Competition.**
- **Received a formal Army Commendation Medal (ARCOM) from a U.S. Brigadier General** for exceptional performance and leadership.
- **Received the Best KATUSA Award from a ROK Battalion Commander** at USAG Daegu.