

Sercan Külçü, Ph.D.

Assistant Professor of Computer Engineering · Giresun University

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Assistant Professor of Computer Engineering with professional software engineering experience dating back to 2005, combining academic teaching and research with extensive hands-on experience in embedded, real-time and distributed software systems. Ph.D. research focused on low-power wireless communication technologies; current research spans deep learning based object detection in radar and sonar imagery, biomedical and agricultural image analysis, and wireless network protocols.

PROFESSIONAL EXPERIENCE

Assistant Professor, Giresun University

2023 – Present

Teach Operating Systems, Data Structures and Algorithms, and Introduction to Programming with Java. Prepare and continuously improve lectures, practical exercises, laboratory activities, assignments and examinations, combining theoretical instruction with hands-on programming practice. Assess student progress through coursework and examinations and provide constructive feedback.

Teaching Assistant, Giresun University

2015 – 2023

Taught and developed course materials for Object-Oriented Programming with Java, Professional Mathematics and Professional English. Conducted tutorials and laboratory sessions, prepared exercises and assessments, and evaluated student performance.

Leader Software Engineer, SDT Space and Defence Technologies

2011 – 2015

Developed digital data recorder systems based on real-time Linux distributions. Integrated software with multiple communication and avionics interfaces including MIL-STD-1553B, ARINC 429, CAN and Ethernet. Customized and optimized Linux kernels to meet project-specific functional and performance requirements, supporting system integration, testing and performance analysis.

Senior Software Engineer, SDT Space and Defence Technologies

2008 – 2011

Developed embedded simulation software using VxWorks, C and C++. Researched guidance and control systems to improve the accuracy and reliability of simulation models, particularly for missile-system applications. Applied mathematical modeling techniques to simulation, guidance and control problems and designed software for resource-constrained embedded platforms.

Software Engineer, SDT Space and Defence Technologies

2005 – 2008

Designed and implemented tactical environment simulation software with cross-functional teams. Developed software for Linux-based systems and integrated distributed simulations using High-Level Architecture and Distributed Interactive Simulation protocols. Established software testing procedures and participated in every stage of the software development lifecycle.

EDUCATION

Ph.D. in Computer Engineering

Karadeniz Technical University, 2022

Developed a simulation framework using the Cooja network simulator, incorporating a steerable smart antenna model, the 6TiSCH protocol and a configurable traffic generator, evaluated on throughput, energy consumption, reliability, packet delivery ratio, end-to-end delay and network lifetime. Also researched computer vision techniques for food science using Python and OpenCV.

M.S. in Information Systems

Hacettepe University, 2010

Built a web-based collaborative dictionary platform in PHP and MySQL, a social media sentiment analysis tool using Python and natural language processing, and a scalable social network analysis architecture based on semantic web and big data technologies.

B.S. in Computer Engineering

Hacettepe University, 2006

Projects included a Tetris game in x86 assembly, a B+ tree based file system in C++, a Java Swing client-server chat application, and a computer vision application for license plate detection and vehicle speed estimation.

RESEARCH INTERESTS

- **Object detection in radar and sonar imagery** — deep learning models for maritime targets and autonomous surface vehicles, including tiled training and slice-aided inference.
- **Biomedical image analysis** — brain tumor classification, nucleus segmentation and automated colony counting.
- **Food and agricultural image analysis** — hazelnut grading and meat freshness classification, including interpretability and bias mitigation.

- **Low-power wireless networks and IoT** — the IETF 6TiSCH protocol, steerable smart antennas, scheduling and routing.
- **Embedded and real-time systems** — avionics software, simulation and resource-constrained platforms.

SELECTED JOURNAL ARTICLES

- Külcü, S. (2026). Enhancing Radar PPI-Based Maritime Object Detection Using Hybrid Preprocessing and Deep Learning Approach. *IEEE Access*, 14, 111715–111730.
- Külcü, S., & Balpetek Külcü, D. (2026). Overcoming resolution constraints in automated colony counting via a high-performance deep learning framework using SAHI. *Scientific Reports*, 16, 24516.
- Külcü, S. (2026). High-Precision Marine Radar Object Detection Using Tiled Training and SAHI Enhanced YOLOv11-OB. *Sensors*, 26(3), 942.
- Külcü, S. (2026). Radar image-based object detection and tracking for autonomous surface vehicles. *Turkish Journal of Maritime and Marine Sciences*, 12(1), 35–47.
- Külcü, S., Görmüş, S., & Jin, Y. (2021). Integration of Steerable Smart Antennas to IETF 6TiSCH Protocol for High Reliability Wireless IoT Networks. *IEEE Access*, 9, 147780–147790.
- Görmüş, S., & Külcü, S. (2019). Enabling space time division multiple access in IETF 6TiSCH protocol. *Turkish Journal of Electrical Engineering and Computer Sciences*, 27(6), 4151–4166.

Full publication list, including conference proceedings and theses: sercankulcu.github.io/publications/

SKILLS

- **Languages** — C, C++, Java, Python, PHP, x86 assembly
- **Embedded and real-time** — VxWorks, real-time Linux, kernel customization
- **Avionics and data buses** — MIL-STD-1553B, ARINC 429, CAN, Ethernet
- **Simulation** — High-Level Architecture, Distributed Interactive Simulation, Cooja
- **Data and vision** — OpenCV, MySQL