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Hossein Shirali
Ph.D. Researcher
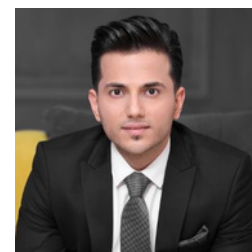
Summary

Ph.D. researcher at the Karlsruhe Institute of Technology (KIT), specializing in computer vision and deep learning. My research focuses on developing AI-driven tools for biodiversity monitoring—particularly for automated invertebrate detection, species classification, and biomass estimation. Experienced in both research and applied development, aiming to create impactful solutions for ecological studies.

Education

Ph.D. Candidate

Karlsruhe Institute of Technology (KIT)   Present, Karlsruhe, Germany

Fields of Study: Biodiversity Research Of Invertebrates Using Deep Learning Methods

Master of Electronic Technologies for BIG DATA and Internet Of Things

University of Bologna   Grade: 110 out of 110.   October 2021, Bologna, Italy

Fields of Study: Statistics and Architectures for Big Data Processing and Communications, Signal Acquisition and Processing.

Bachelor of Electronic Engineering

Shahid Chamran University of Ahvaz   2017, Iran

Fields of Study: Computer Architecture, Digital system, Electronics

Experience

Doctoral Researcher   March 2023 - Present, Karlsruhe

Karlsruhe Institute of Technology

- Developed and optimized deep learning models for insect species classification.
- Engineered a 2D-image-based biomass estimation pipeline using advanced neural networks.
- Integrated AI modules into robotics systems for automated detection, imaging, and sorting of specimens.
- Contributed to the Entomoscope project, enabling real-time invertebrate identification and analysis.

Data Scientist Consultant   February 2022 - March 2023, Remote

Modis / Baker Hughes

- Developed an optimization algorithm to improve turbine maintenance efficiency.
- Led a cloud data migration project and implemented enhanced data security protocols.
- Designed automation tools using Microsoft Power Platform and conducted internal training sessions for O365 tools.

Junior Data Scientist   February 2021 - October 2021, Bologna , Italy

Plasive Technologies

- Designed and trained CNN-based models for semantic segmentation of satellite imagery.
- Developed an innovative carbon stock estimation method using remote sensing and data analytics.
- Constructed a comprehensive multi-dimensional dataset to support advanced satellite image research.

Machine Learning Intern

Kiwitron   September 2020 - January 2021, Bologna, Italy

- Developed a semi-automatic image labeling method using point cloud data as a master thesis.
- Achieved state-of-the-art performance in image annotation tasks.

Publications

Shirali, H., Hübner, J., Both, R., Raupach, M., Reischl, M., Schmidt, S., & Pylatiuk, C. (2024). Image-based recognition of parasitoid wasps using advanced neural networks. Invertebrate Systematics, 38, IS24011. https://doi.org/10.1071/IS24011

Wührl, L., Keller, L., Klug, N., **Shirali, H.**, Meier, R. & Pylatiuk, C. (2024). Automated handling of biological objects with a flexible gripper for biodiversity research. at - Automatisierungstechnik, 72(7), 672-678. https://doi.org/10.1515/auto-2023-0238

Klug, N., Kramer, M., Mazrek, F., Wührl, L., **Shirali, H.**, Meier, R., Pylatiuk, C. (2024). Automated Photogrammetric Close-Range Imaging System for Small Invertebrates Using Acoustic Levitation. Preprint. DOI: 10.36227/techrxiv.172651022.21831566/v1

Skills

Programming & Frameworks: Python, scikit-learn, TensorFlow, Keras, PyTorch
Tools & Platforms: Docker, Kubernetes, Streamlit, Gradio, Microsoft Power Platform, Git

Conferences & Presentations

Entomology Congress (DGaaE 2025), Geisenheim, Germany
- Presentation: "AI-driven advances in Species Identification and Biomass Analysis"

27th International Congress of Entomology (ICE 2024), Kyoto, Japan
- Presentation: "AI as a Catalyst in Entomological Research by Simplifying Species Identification"

Helmholtz Artificial Intelligence Conference (Helmholtz AI 2024), Düsseldorf, Germany
- Poster Presentation: "Advancing Biodiversity Research with AI-Driven Automation"

Helmholtz Imaging Conference (2023), Hamburg, Germany
- Poster Presentation: "Automated Biodiversity Research"

Languages

Persian: Nativ
English: Upper-intermediate (C1) – IELTS 6.5 (2018)
German: Basic (A2)

refrences

Prof. Dr. Christian Pylatiuk

Institute for Automation and Applied Informatics (IAI)
Group Leader Biomedical Engineering & Robotics
Karlsruhe Institute of Technology (KIT)
Email: christian.pylatiuk@kit.edu

Prof. Dr. Rudolf Meier

Head of the Center for Integrative Biodiversity Discovery
Museum für Naturkunde Berlin
and Professor at Humboldt University zu Berlin
Email: rudolf.meier@mfn.berlin