

# Elvin Hajizada

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## AI Researcher | Robot Learning & Embodied AI

Robot Learning · Vision-Language-Action & World Models · Perception · Continual & Online Learning

**Work authorization:** Permanent residence in Germany (Niederlassungserlaubnis); no visa/sponsorship required.

### PROFILE

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PhD-level AI researcher with six years of industry R&D at Intel Labs Munich (2020–2026) building learning systems for robots and embodied agents: real-time perception, vision-based object recognition, closed-loop control, and continual adaptation to shifting objects, environments, and tasks after deployment. Hands-on with real robot hardware, ROS / ROS 2, and simulation (MuJoCo, Gazebo); models built in PyTorch and validated in real-time closed-loop deployment on a bio-mimetic robot arm and across edge platforms (NVIDIA Jetson, Intel Loihi). Award-winning published research on few-shot adaptation and continual learning under distribution shift (85% reduction in catastrophic forgetting; ICONS 2022 Best Paper; IROS 2024 & 2025; ICANN 2026; Nature Communications under review). Supervised student theses across computer vision, robot learning, and collaborated cross-functionally with hardware teams and external partners while exploring use-cases with potential customers. Current focus: test-time and continual adaptation of vision-language-action and world models on manipulation benchmarks.

### SKILLS

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**Robot Learning & Control:** Real-time Perception, Closed-loop Control, AI Robotics, Vision-Language-Action (VLA) Models, World Models, Tactile Sensing, Imitation Learning, Reinforcement Learning

**Perception:** Computer Vision, Object Detection & Recognition, Visual Tracking, Multi-modal (Vision + Tactile) Fusion, Event Cameras, OpenCV

**Deep Learning & ML:** PyTorch, Scikit-learn, Deep Learning, CNNs, RNNs, Transformers, Vision Transformers, Spatio-temporal Networks, Self-/Semi-supervised Learning, Spiking Neural Networks (SNN)

**Adaptive & Continual Learning:** Continual Learning, Online Learning, Test-time Adaptation, Domain Adaptation, Distribution Shift, Few-shot Learning, Open-world Learning, Novelty Detection, Meta-learning

**Engineering, Simulation & Tooling:** Python, C++, ROS / ROS 2, MuJoCo, Gazebo, YARP, Git, Docker, Unix / Linux, LAVA (open-source neuromorphic framework)

**Edge Deployment & Optimization:** NVIDIA Jetson, Intel Loihi 1 & 2, Model Optimization for Edge, Quantized Models, TensorRT, CUDA, Latency/Energy Profiling, Real-time Systems

**Languages:** English (full professional / C2), German (B2 comprehension, B1 speaking, improving), Azerbaijani & Turkish (native)

### WORK EXPERIENCE

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**AI Researcher** · Full-time

*Intel — Neuromorphic Computing Lab*

06/2021 – 03/2026

Munich, Germany

- Built **real-time learning systems** for autonomous, embodied agents: robots that adapt to shifting objects, environments, and tasks after deployment, learning from data streams under **distribution shift**.
- Profiled and optimized deep learning vision models across **edge platforms (Intel Loihi 1/2, NVIDIA Jetson)** under latency, memory, and energy budgets; validated real-time learning methods for robotics applications.
- Developed **Continually Learning Prototypes (CLP)**, a novel rehearsal-free algorithm for lifelong learning that **reduces catastrophic forgetting by 85%** in dynamic environments; leverages pre-trained representations for **few-shot, data-scarce adaptation** (IROS 2024).
- Designed an **ultra-efficient continual-learning framework** for edge compute on Intel Loihi 2: real-time on-chip learning at **sub-millisecond latency, 70× speed-up and ~6,600× lower energy** than edge-GPU baselines; validated on robotic learning tasks, suitable for closed-loop control (Nature Communications, under review).
- Developed an **online continual-learning algorithm for event cameras**: real-time adaptation to novel objects from asynchronous sensor streams under streaming, low-bandwidth input regimes (ICANN 2026).
- Supervised three student theses spanning computer vision, robot learning, and edge deployment; collaborated cross-functionally with hardware teams and with academic and industrial partners; explored commercial use-cases with potential customers.

**Neuromorphic Computing Research Intern** · Internship

*Intel — Neuromorphic Computing Lab*

07/2020 – 05/2021

Munich, Germany

- Developed a spiking neural network for **incremental, real-time object learning** on Intel Loihi: an early demonstration of on-device continual learning for robotic perception pipelines.

- Designed a cerebellum-inspired **adaptive control network** on Intel Loihi for **closed-loop control of a bio-mimetic robot arm**, learning a real-time mapping from sensory feedback to motor commands under hard latency constraints; demo: [youtu.be/0Xefys6CpQU](https://youtu.be/0Xefys6CpQU).

## SELECTED PROJECTS

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### **Test-time & continual adaptation of VLAs and World Models on the LIBERO manipulation benchmark** (in progress)

- Toward a modular predictive world model with multi-time-scale continual learning with VLA as baselines; integrated hardware-efficiency analysis on NVIDIA Jetson Orin Nano.

### **CLANE — Spatiotemporal action recognition on neuromorphic hardware**

- End-to-end on-chip spiking pipeline (2D SCNN + CLP-SNN head) on Loihi 2: online class-incremental learning of human actions from event-camera streams at 5 ms/sample and mJ-level energy; 16× latency and >100× energy reduction vs. Jetson Orin Nano baseline (ICANN 2026).

### **Algorithm-hardware co-designed adaptive AI for resource-constrained systems (CLP)**

- Novel continual learning (CLP) for edge AI systems reducing catastrophic forgetting, with theoretical contributions to memory consolidation in spiking networks (IROS 2024; Nature Communications under review).

### **Multi-modal Robot Learning (M.Sc.)**

- Vision + tactile sensor fusion with hierarchical classification for few-shot object recognition; end-to-end pipeline from raw sensor input to classification output.

## SELECTED PUBLICATIONS

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Online Continual Learning on Intel Loihi 2 via a Co-designed Spiking Neural Network.

*Nature Communications (under review, 2025)* · First author

Interactive Continual Learning for Robots: a Neuromorphic Approach.

*ICONS 2022 — Best Paper Award* · First author

CLANE: Continual Learning of Actions on Neuromorphic Hardware from Event Cameras.

*ICANN 2026* · First author

Efficient Online Learning with Predictive Coding Networks: Exploiting Temporal Correlations.

*IROS 2025* · Co-author

Continual Learning for Autonomous Robots: A Prototype-based Approach.

*IROS 2024* · First author

## EDUCATION

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### **Ph.D. in Artificial Intelligence**

LMU & TUM

08/2021 – 06/2026 (submission)

Munich, Germany

### **M.Sc. in Neuroengineering (Elite Program)**

Technical University of Munich

10/2018 – 03/2021

Munich, Germany

GPA 1.4 (≈ 3.70 / 4.0). Thesis: Interactive Continual Learning for Robots: a Neuromorphic Approach.

### **B.Sc. in Electrical & Electronics Engineering**

Bilkent University

09/2014 – 06/2018

Ankara, Türkiye

GPA 3.61 / 4.00.

## AWARDS & FELLOWSHIPS

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- Best Paper Award — ICONS 2022 (interactive continual learning on Intel Loihi).
- Intel “Fearless Innovation” Award (2022) — internal recognition for continual-learning results.
- DAAD Fellowship (German Academic Exchange Service); Bernstein SMARTSTART Fellow (Computational Neuroscience).

## REFERENCES

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**Prof. Dr. Yulia Sandamirskaya** · ZHAW Zurich University of Applied Sciences · [yulia.sandamirskaya@zhaw.ch](mailto:yulia.sandamirskaya@zhaw.ch)  
PhD and M.Sc. supervisor at Intel’s Neuromorphic Computing Lab, Munich (2020–2023); supervised continual-learning work for robotic perception, including the ICONS 2022 Best Paper.

**Dr. Tim Shea** · Research Scientist, Southwest Research Institute (US) · [tim.m.shea@gmail.com](mailto:tim.m.shea@gmail.com)  
Manager at Intel Labs Munich (2025–2026); oversaw PhD research on real-time learning and deployment across Loihi 2 and NVIDIA Jetson, including the Nature Communications submission.

*Both referees are happy to be contacted by email in the first instance.*