

# Burak Ercan

Principal Computer Vision & AI Engineer | Ph.D. in Neuromorphic Event-Based Vision

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## Summary

Seasoned computer vision & AI engineer with a Ph.D. in neuromorphic event-based vision and 15+ years of industrial experience at large defense companies and AI startups. Proven track record in leading technical direction and designing AI-driven solutions across diverse sectors, including defense, aviation, robotics, smart cities, transportation, and healthcare.

## Experience

### Freelance, Principal Computer Vision & Embedded AI Engineer

Ankara, Türkiye  
Jan 2025 – present  
1 year 2 months

- Led technical direction and architecture decisions while maintaining hands-on ownership of the entire embedded AI pipeline and core development.
- Designed and implemented a deep learning-based stereo depth estimation pipeline optimized for custom NVIDIA Jetson-based hardware, using TensorRT to quantize neural networks and CUDA-accelerated kernels for fast pre- and post-processing, achieving 2-4x improvements in both inference speed and accuracy.
- Profiled and re-implemented image-processing pipelines using NVIDIA Performance Primitives (NPP), achieving 6x higher performance than OpenCV CPU and 3x higher than OpenCV CUDA implementations through systematic optimization and NVIDIA Nsight profiling.
- Applied real-time Linux techniques (CPU isolation, affinity, interrupt routing, and RT scheduling) to stabilize latency-critical paths on Jetson Orin Nano, reducing timing variability by up to 8x (MSE) for time-sensitive event processing.
- Designed and implemented custom color-conversion routines supporting multiple bit depths, color spaces, and pixel formats, then optimized them using multithreading and ARM SIMD intrinsics, achieving a 20x runtime reduction.

### Exin Health AI, Staff Machine Learning Engineer

Ankara, Türkiye  
June 2024 – Jan 2025  
8 months

- Developed algorithms for various computer vision tasks, including classification, object detection, instance segmentation, and temporal action localization.
- Created an end-to-end federated learning pipeline with components for servers, clients, data collection and annotation, performance evaluation, and more.
- Implemented audio processing pipelines including voice activity detection and speech recognition.
- Leveraged large language models (LLMs) to extract information from noisy automatic speech recognition (speech-to-text) outputs.
- Designed complex algorithms and data-flow pipelines seamlessly integrating edge devices, cloud platforms, and local workstations.

**HAVELSAN, Senior Computer Vision Engineer**

- Designed and developed computer vision-based scalable video analytic applications for smart cities.
- Researched and developed terrain traversability estimation algorithms using multiple sensor modalities for autonomous ground robots in unstructured outdoor environments.
- Developed 3D surround view systems for automotive applications.
- Researched deep learning based computer vision algorithms for autonomous driving.
- Researched and developed color correction methods for image and video stitching.
- Developed real-time georeferencing solutions using GNS/INS and DEM data for various platforms.
- Gained experience in algebraic multigrid methods for solving large systems of partial differential equations.

Ankara, Türkiye  
Apr 2020 – June 2024  
4 years 3 months

**ArgosAI, Senior Computer Vision Engineer**

- Designed, trained, and tested deep learning based neural networks for classification, segmentation, and detection.
- Developed image processing pipelines with classical computer vision techniques for image registration and foreground/background detection using C++, STL, Boost, and OpenCV.
- Wrote Python scripts to create, manage, process, and synthesize large image datasets.
- Wrote Python scripts to automate various tasks such as end-to-end system testing.
- Worked as the product owner of A-FOD, the flagship product of ArgosAI for airfield safety and management.

Ankara, Türkiye  
Feb 2019 – Mar 2020  
1 year 1 month

**ASELSAN, Senior Software Engineer**

- Developed software for a wide range of product families, including hand-held thermal cameras, electro-optic sensor systems, and laser warning receiver systems for airborne, naval, and land platforms.
- Led teams of junior software developers and subcontractors by analyzing requirements, decomposing projects into basic tasks, and integrating software components.
- Improved quality and reusability of software by making use of object-oriented design principles, design patterns, modular programming, and unit testing.
- Designed and developed reusable software modules for various hardware architectures including Xilinx Microblaze and Altera Nios II based boards.
- Worked on non-uniformity correction, bad pixel replacement, and image enhancement algorithms for thermal images.
- Managed software through full lifecycle using CMMI Level 3 compliant processes with requirements management, source control, and issue tracking tools.
- Developed graphical user interfaces using Qt, C#, Borland C++, and NI LabWindows.
- Gained hands-on experience on RTOS concepts, file systems, UDP/FTP protocols, MIL-STD-1553, PCIe, RS-422, and RS-485 standards.

Ankara, Türkiye  
Dec 2011 – Oct 2018  
6 years 11 months

**SDT - Space & Defence Technologies, Part Time R&D Engineer**

- Implemented an FPGA based SD card controller for recording/playing streaming video, controlled from a graphical user interface.
- Programmed FPGA using VHDL and Xilinx ISE.
- Gained hands-on experience on SPI interface, Secure Digital, and JPEG 2000 standards.

Ankara, Türkiye  
Sept 2010 – June 2011  
10 months

## Education

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<b>PhD</b>	<b>Hacettepe University</b> , Computer Science <ul style="list-style-type: none"><li>Conducted research on event-based vision and deep learning under supervision of Associate Professors Erkut Erdem and Aykut Erdem.</li><li>A member of Hacettepe University Computer Vision Laboratory (HUCVL).</li><li>Completed courses: Computer Vision, Deep Learning, Image Processing, Advanced Computer Vision, Advanced Deep Learning, Optimization, and Text Mining.</li><li>CGPA: 3.97/4.00.</li><li>Thesis: Reconstructing intensity images from events, with publications in IEEE TIP, CVPR Workshops, and ECCV Workshops.</li><li>Previous research interests: person re-identification, visual question answering, visual reasoning, and intuitive physics.</li></ul>	Ankara, Türkiye Sept 2017 – June 2024
<b>MS</b>	<b>Middle East Technical University</b> , Engineering Management <ul style="list-style-type: none"><li>Studied data mining and machine learning methods for solving business problems under supervision of Assoc. Prof. Dr. Cem İyigün.</li><li>Devised a method for predicting fixing times of software bugs in Aselsan.</li></ul>	Ankara, Türkiye 2012 – 2015
<b>BS</b>	<b>Middle East Technical University</b> , Electrical and Electronics Engineering <ul style="list-style-type: none"><li>Specialized in computers area by completing courses on computer architecture, microprocessors, data structures, operating systems, computer networks, digital signal processing, and VLSI design.</li><li>Capstone project: Designed and implemented a robot that pushes goods to designated areas in a warehouse with obstacles using the shortest path.</li></ul>	Ankara, Türkiye 2006 – 2011

## Publications

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<b>HUE Dataset: High-Resolution Event and Frame Sequences for Low-Light Vision</b> <b>Burak Ercan</b> , Onur Eker, Aykut Erdem, Erkut Erdem (European Conference on Computer Vision (ECCV) Workshops)	2024
<b>HyperE2VID: Improving Event-Based Video Reconstruction via Hypernetworks</b> <b>Burak Ercan</b> , Onur Eker, Canberk Sağlam, Aykut Erdem, Erkut Erdem (IEEE Transactions on Image Processing)	2024
<b>EVREAL: Towards a Comprehensive Benchmark and Analysis Suite for Event-based Video Reconstruction</b> <b>Burak Ercan</b> , Onur Eker, Aykut Erdem, Erkut Erdem (IEEE/CVF Computer Vision and Pattern Recognition Workshops (CVPRW))	2023
<b>Detection of Traffic Light Violations from Fish Eye Driver Cameras of Public Transport Buses</b> <b>Burak Ercan</b> , Mehmet Fatih Özdemir, Onur Eker, Mehmet Can Baytekin, Murat Bal (31st Signal Processing and Communications Applications Conference (SIU))	2023
<b>A Real-time 3D Surround View Pipeline for Embedded Devices</b> Onur Eker, <b>Burak Ercan</b> , Berkant Bayraktar, Murat Bal (VISIGRAPP (VISAPP))	2022
<b>Synthetic18K: Learning Better Representations for Person Re-ID and Attribute Recognition from 1.4 Million Synthetic Images</b> Onur Can Üner, Cem Aslan, <b>Burak Ercan</b> , Tayfun Ateş, Ufuk Çelikcan, Aykut Erdem, Erkut Erdem (Signal Processing - Image Communication)	2021

## **Skills**

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**Core Technical Skills:** Computer Vision, Machine Learning, Deep Learning, Image Processing, Imaging Pipelines, Event-Based Vision, Robotic / Autonomous Vehicles, Embedded Software Design and Development, Real-Time Operating Systems, Electro-Optic Systems, Object-Oriented Design & Programming

**Programming Languages:** C/C++, Python, MATLAB, C#, VHDL

**Libraries & Frameworks:** PyTorch, TensorFlow, Keras, NumPy, SciPy, Scikit-learn, OpenCV, ONNX, TensorRT, Triton, ROS, PCL, CUDA, NPP, BOOST, Qt, GStreamer, AmgX, Eigen, AirSim, GDAL, .NET

## **Achievements**

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- Ranked 307th in the national university entrance exam among 1.5 million candidates (2006).
- TOEFL iBT Score: 109/120 (Reading: 29/30, Listening: 30/30, Speaking: 23/30, Writing: 27/30).