

Burak Kakillioglu

burak.kakilli.com * Somerville, MA

Profile

PhD in 3D computer vision with image processing and machine learning expertise. Strong personal enthusiasm and professional experience with autonomous robotic systems. A multitude of graduate level software engineering courses alongside an Electrical Engineering degree (B.S). Notable experience on common DevOps practices, such as Git and Docker. Ability to work on broad range of hardware, OS, software languages, tools and cloud platforms. Detailed, dedicated and proactive personality.

Experience

Motorola Solutions Inc., Somerville, MA Jun 2021-Present

AI Video Analytics R&D Manager

- Lead a team of research scientists and engineers to develop, improve, and maintain AI-based video analytics features on MSI-branded security cameras.

Senior Machine Learning Engineer

- Designed and implemented various computer vision algorithms for video analytics on Avigilon cameras.
- Trained deep NN models for object detection in multiple modalities, such as RGB, infrared, thermal.

Automodality Inc., San Rafael, CA

Nov 2019-May 2020 / Jan 2017-Dec 2017

3D Computer Vision Intern / RA

- Contributed to the development of 3D lidar point cloud segmentation on Jetson TX2 for perception-localization module of aerial asset inspection vehicle.
- Developed a 3D localization algorithm using stereo camera for the aerial bridge inspection vehicle.

SRI International, Princeton, NJ

May 2019-Aug 2019

3D Computer Vision Intern

- Developed 3D segmentation algorithm and backend software for 3D point clouds from lidar and stereo cameras for Automatic Volumetric (Tree) Log Measurement.

Syracuse University, Syracuse, NY

Aug 2015-May 2021

Research Assistant

- Several algorithms and machine learning models for 3D aerial vehicle vision (PhD Study).
- Microcam (ARPA-E): A system of platforms that detects human presence for substantial improvement in HVAC efficiency.
- AirBEM (ARPA-E): An intelligent aerial vehicle platform for auditing thermal deficiencies for building energy retrofits.

Education

Syracuse University, Syracuse, NY

Aug 2015-Jul 2021

PhD, Electrical and Computer Engineering, 3.90

Advisor: Senem Velipasalar

Thesis: Computer Vision Applications for Autonomous Aerial Vehicles

Bilkent University, Ankara, Turkey

Sept 2011 – Jun 2015

BS, Electrical and Electronics Engineering

Technical Skills

- **Python, C/C++**, MATLAB, Java, C#, web languages, HDL, Assembly
- **PyTorch**, Tensorflow, **Numpy**, OpenCV, **Open3D**, **ROS**, PCL
- **Linux**, Windows, OSX, Android
- **Jetson, Raspberry Pi**, PX4, Arduino (derivatives), FPGA
- **Git, Docker**, Swarm, Continuous Integration, Full stack web/API development

Honors and Awards

- 2022 All University Doctoral Prize, Syracuse University
- Tuition Scholarship, Electrical and Electronics Engineering, Bilkent University
- 99.9 percentile ranking in the national university entrance exam (YGS)

Patents and Publications

[P1] P. Venetianer, **B. Kakillioglu**, A. Lipchin and X. Xiao, "Hybrid video analytics for small and specialized object detection" - US Patent App. 17/662,050, 2023

[J1] J. Chen, **B. Kakillioglu** and S. Velipasalar, "Background-Aware 3D Point Cloud Segmentation with Dynamic Point Feature Aggregation" in IEEE Transactions on Geoscience and Remote Sensing, 2022

[J2] **B. Kakillioglu**, A. Ren, Y. Wang and S. Velipasalar, "3D Capsule Networks for Object Classification With Weight Pruning" in IEEE Access, vol. 8, pp. 27393-27405, 2020

[J3] T. Rakha, A. Liberty, A. Gorodetsky, **B. Kakillioglu** and S. Velipasalar, "Heat Mapping Drones: An Autonomous Computer-Vision-Based Procedure for Building Envelope Inspection Using Unmanned Aerial Systems (UAS)", 2018 Technology|Architecture + Design, 2:1, 30-44

[C1] J. Chen, **B. Kakillioglu**, H. Ren and S. Velipasalar, "Why discard if you can recycle?: A recycling max pooling module for 3d point cloud analysis", IEEE/CVF conference on Computer Vision and Pattern Recognition (CVPR), New Orleans, 2022

[C2] **B. Kakillioglu**, Y. Masri, C. Pan, E. Panagoulia, N. Bayomi, K. Chen, J. Fernandez, T. Rakha and S. Velipasalar, "A Performance Metric for the Evaluation of Thermal Anomaly Identification with Ill-Defined Ground Truth ", EG-ICE 2021 Workshop on Intelligent Computing in Engineering. Universitätsverlag der TU Berlin, 2021.

[C3] **B. Kakillioglu**, J. Wang, S. Velipasalar, A. Janani and E. Koch, "3D Sensor-Based UAV Localization for Bridge Inspection", 2019 53rd Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2019, pp. 1926-1930.

[C4] **B. Kakillioglu**, S. Velipasalar, and T. Rakha. "Autonomous heat leakage detection from unmanned aerial vehicle-mounted thermal cameras", In Proceedings of the 12th International Conference on Distributed Smart Cameras, pp. 1-6. 2018.

[C5] **B. Kakillioglu** and S. Velipasalar, "Autonomous altitude measurement and landing area detection for indoor UAV applications", 2016 13th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS), Colorado Springs, CO, 2016, pp. 166-172.

[C6] **B. Kakillioglu**, K. Ozcan and S. Velipasalar, "Doorway detection for autonomous indoor navigation of unmanned vehicles", 2016 IEEE International Conference on Image Processing (ICIP), Phoenix, AZ, 2016, pp. 3837-3841.