Burak Kakillioglu

bkakilli.github.io * Syracuse, NY

Profile

PhD on 3D computer vision with significant 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 with 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 and tools. Detailed, dedicated and proactive personality.

Experience

Motorola Solutions Inc., Boston, MA — Jun 2021-Present
Senior Machine Learning Engineer

- Designed and implemented an improved camera tampering detection algorithm on the existing video analytics stack.

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 for 3D point clouds from lidar and stereo cameras for Automatic Volumetric (Tree) Log Measurement
- Implemented a framework to combine 2D and 3D tree log segmentation
- Implemented the backend of Automatic Log Measurement software

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)

Selected Publications

[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, vol. 60, pp. 1-12, 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)" in Technology|Architecture + Design, 2018, 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 Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 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, 2021.

[C3] J. Chen, **B. Kakillioglu**, S. Velipasalar, “Hierarchical grow network for point cloud segmentation” 54th Asilomar Conference on Signals, Systems, and Computers, 2020. IEEE.

[C4] **B. Kakillioglu**, J. Wang, S. Velipasalar, A. Janani and E. Koch, "3D Sensor-Based UAV Localization for Bridge Inspection", 53rd Asilomar Conference on Signals, Systems, and Computers, 2019. IEEE.

[C5] **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, 2018.

[C6] **B. Kakillioglu** and S. Velipasalar, "Autonomous altitude measurement and landing area detection for indoor UAV applications", 13th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS), 2016.

[C7**] B. Kakillioglu**, K. Ozcan and S. Velipasalar, "Doorway detection for autonomous indoor navigation of unmanned vehicles", IEEE International Conference on Image Processing (ICIP), 2016.