Burak Kakillioglu

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Education

P.h D. in Electrical and Computer Engineering — 2015 – 2020 (expected)
Syracuse University, Syracuse, NY, USA
Research: 3D vision applications and autonomous UAV guidance by 3D vision
Advisor: Dr. Senem Velipasalar

B.Sc. in Electrical and Electronics Engineering — 2010 – 2015
Bilkent University, Ankara, TURKEY

Research

Research Assistant, Smart Vision Systems Lab, Syracuse University — 2015 – present

Interests: **3D computer vision** and deep learning.
Secondary: Embedded systems design and development, machine intelligence.

Projects

- 3D patch localization on large-scale point clouds
- 3D object detection via multi-modal sensor fusion from autonomous UAVs
  - Convolutional Multi-Scale 3D Object Detector from Single Shot Captures
- Heat leakage detection from thermal images of the buildings captured by UAVs
- 3D vision-based autonomous drone guidance framework
  - Doorway detection based on 3D point cloud data and color images
  - Accurate and real altitude measurement and autonomous safe landing location detection
  - Highly modular autonomous UAV control and guidance framework

Undergraduate Research — 2014 – 2015

Senior Project, Bilkent University, Electrical and Electronics Engineering
Tracking and Predicting Possible Dangers in Mines and Position Tracking for Miners by Using Wireless Sensor Network — 2015
Advisors: Prof. Nail Akar, Dr. Alper Sarikan

Research Project, Bilkent University, Electrical and Electronics Engineering
H.264 Video Decoding and Android Application, Part of the project of Ministry of Forestry. Advisor: Prof. Enis Cetin

Publications

Journal Papers

- M.L. Scalzo, Y. Zheng, **B. Kakillioglu**, S. Velipasalar, “Obstacle Detection and Classification with Portable Uncalibrated Structured Light”, IEEE Sensors Journal (In-press) — 2018
- T. Rakha, **B. Kakillioglu**, et al., “Heat Mapping Drones: An Autonomous Computer Vision-based Procedure for Building Envelope Inspection using Unmanned Aerial Systems (UAS)”, *Technology | Architecture + Design* — 2018

Conference Papers

- **B. Kakillioglu**, S. Velipasalar, T. Rakha, “Autonomous Heat Leakage detection from Unmanned Aerial Vehicle-Mounted Thermal Cameras”, *ACM International Confererence on Distributed Smart Cameras (ICDSC 2018)* — 2018
- A. Ahmad, **B. Kakillioglu**, S. Velipasalar, “3D Capsule Networks for Object Classification from 3D Model Data”, *Asilomar 2018* — 2018
- M.L. Scalzo, Y. Zheng, **B. Kakillioglu**, S. Velipasalar, “Obstacle Detection and — 2018

Identification with Portable Uncalibrated Patterned Light", *Asilomar 2018*

- Y. Lu, **B. Kakillioglu**, S. Velipasalar, "Autonomously and Simultaneously Refining Deep Neural Network Parameters by Generative Adversarial Networks", *ArXiv* 2018
- **B. Kakillioglu**, A. Ahmad, S. Velipasalar, "Object Classification from 3D Volumetric Data with 3D Capsule Networks" (Under Revision) 2018
- M.L. Scalzo, Y. Zheng, **B. Kakillioglu**, S. Velipasalar, "Obstacle Detection and Classification with Portable Uncalibrated Structured Light" 2018
- **B. Kakillioglu**, S. Velipasalar, "Autonomous Altitude Measurement and Landing Area Detection for Indoor UAV Applications" *IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS 2016)* 2016
- **B. Kakillioglu**, K. Ozcan, S. Velipasalar, "Doorway Detection for Autonomous Indoor Navigation of Unmanned Vehicles", *IEEE International Conference on Image Processing (ICIP 2016)* 2016

Professional Experience

Summer Intern, ASELSAN INC. 2014

Underwater Communication System: BPF Design Using FPGA and MATLAB, Interfacing with 24-Bit ADC and DAC, communication protocol

Summer Intern, Arcelik INC. 2013

R&D TV Design Application intern. RC-5 Com. Protocol, DC-DC Converter Topologies, LVDS Technology, PCB Design with Altium Desginer

Technical Skills

Software

Very fluent: **Python, C/C++, Matlab**
Fluent: Java, C#, Android, Assembly
Experience in: Bash, VHDL, JavaScript, PHP, CSS, SQL

Tools and APIs

TensorFlow, Keras, OpenCV, Numpy/Scipy, PCL, ROS, pymavlink.

Hardware

Raspberry Pi and similar embedded platforms, Nvidia Jetson, Arduino, Pixhawk Flight Controller, FPGA

OS

Windows, Linux (advanced), OSX (intermediate)

Concepts

Computer vision, machine learning, embedded system design (hw/sw), IoT, signal processing, software engineering, electrical engineering.

Course Highlights

Deep Learning, OOD, Advanced Data Structures and Algorithms, Embedded System Design, Data Mining, Image and Video Processing, Software Modelling, Electronic Circuit Design, Digital Signal Processing, Advances in Deep Learning (enrolled)

Course Projects

Graduate Course Projects 2015 – 2017

- Raspberry Pi based autonomous speaker (person of interest) tracker and camera position control with step motor
- C# .NET based Test Harness server and client
- C++ Dependency Analyzer with online code publisher server and repository, user client

Undergraduate Course Projects 2011 – 2015

- Tracking and Predicting Possible Dangers in Mines and Position Tracking for Miners via Wireless Sensor Network
- H.264 Video Decoding and Android Application
- Speech Processing for Android Hearing Aid Application
- Buck Converter Based Adjustable Voltage Supply

- Infrared Chat Terminal using 8051 Microprocessor
- VGA Display Animated Parking System using FGPA
- TRC-10 AM Band Transceiver Radiotelephone
- Java Physics Simulator

Personal Projects

- Wirelessly Controllable Home-Garden Automation System 2014

Honors and Awards

2nd place on Student Poster Competition, Syracuse COE Symposium 2017
Honor and High Honor Certificates, Bilkent University Electrical Engineering Department 2011 – 2015
Tuition Scholarship, Bilkent University Electrical Engineering 2010
Top 0.07%, National University Entrance Exam among 1.5m+ candidates 2010

Languages

Turkish (Native)
English (Proficient)
Italian (Elementary)

Service and Outreach

Turkish Student Association at Syracuse University 2015 – present
VP, Secretary, Officer

Bilkent IEEE Student Branch 2010 – 2014
Worked as a volunteer student member. Involved in organization of 100+ events. Roles include e-board mentor, e-board treasurer, webmaster, active member.

Chair, Bilkent Robotics Club 2015
Organization of hobby electronics workshops.

Organization Team, Road to University, Bilkent University 2011 – 2015
An educational program organized by student volunteers.