# BURAK UZKENT

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## EDUCATION

**Rochester Institute of Technology**                    *August 2011 - May 2016*
**Ph.D.**, Chester F. Carlson Center for Imaging Science
*Thesis Topic*: Aerial visual vehicle detection and tracking using an adaptive, multi- modal sensor.
*Advisor*: Matthew J. Hoffman, Ph.D.
*Co-Advisor*: Anthony Vodacek, Ph.D.

**University of Bridgeport**                    *August 2009 - May 2011*
**M.S.**, Department of Electrical Engineering
*Thesis Topic*: Environmental non-speech sound classification with a new set of time- domain features.
*Advisor*: Buket D. Barkana, Ph.D.

**Eskisehir Osmangazi University**                    *September 2004 - May 2009*
**B.S.**, Department of Electrical and Electronics Engineering
*Thesis Topic*: Autonomous parallel parking of non-holonomic vehicles
*Advisor*: Osman Parlaktuna, Ph.D.

## WORK EXPERIENCE

**Postdoctoral Fellow**                    *July 2018 -*
Computer Science, Stanford University, Stanford CA
*Advisor* : Stefano Ermon, Ph.D.
Conducting research on building deep learning models with small sample complexity, building deep learning models to better utilize low quality data, and building agents to adaptively choose data. Additional research works include building machine learning models for sustainability using data from different modalities.

**Computer Vision Engineer**                    *June 2017 - July 2018*
Planet Labs, San Francisco, CA
Worked on object detection in satellite images using convolutional object detectors and built a large-scale object detection dataset using satellite images, and conducted research to tackle small object detection in low resolution satellite images.

**Computer Vision Engineer**                    *August 2016 - June 2017*
Autel Robotics, San Ramon, CA
*Manager* : Youngwoo Seo, Ph.D.
Worked on a long-term target following system that will be deployed in the next generation drones. This work involves designing an online learning method to track a single object from a monocular camera at real-time on a low-end embedded plafform. Other part of my work includes implementing and testing the tracking algorithm on the embedded platform.

**Computer Vision Algorithm Engineer Intern**                    *November 2015 - May 2016*
Futurewei Technologies (Huawei R&D), Bridgewater, NJ
*Supervisor*: Dong-Qing Zhang, Ph.D.
My internship work was two-folds. First, I designed a subspace learning method to detect strangers in a family photo album using face-only and contextual features learned by fine-tuned Deep Convolutional Neural Networks. In the second step, I designed a probabilistic graph-based approach to assign semantic roles to individuals detected to be family members in the first step.

## RESEARCH EXPERIENCE

**Graduate Research Assistant** *April 2012 - July 2016*
Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology, NY
***Advisor***: Matthew J. Hoffman, Ph.D.
Conducted research on aerial vehicle detection and tracking inspired by an adaptive, multi-modal sensor. This work involves developing computer vision and machine learning methods to detect, associate and track ground vehicles in an aerial video. The unique challenges posed by medium-to- high altitude aerial tracking is addressed by efficient use of rich hyperspectral data acquired by an adaptive hyperspectral sensor.

**Graduate Research Assistant** *May 2014 - June 2014*
Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology, NY
***Advisor***: Elizabeth Cherry, Ph.D.
Performed research on 3-D MRI cardiac segmentation. A probabilistic graph-based approach has been proposed to segment the full tissue volume of the heart. A distance term has been incorporated to improve segmentation at the faint boundaries of the heart in MRI slices. The full tissue volume of the heart is required to fully understand the underlying mechanics behind the ventricular fibrillation.

**Graduate Research Assistant** *August 2009 - May 2011*
Electrical Engineering Department, University of Bridgeport, CT
***Advisor***: Buket D. Barkana, Ph.D.
Conducted research on classifying environmental sounds to classify abnormal and normal events. A new, pitch range-based features were proposed to improve the classification. On the classification end, a non-linear Support Vector Machine and Radial Basis Function Neural Network were trained to classify the test data. The results indicate that the new set of low dimensional features leads to higher accuracy rates when they are combined with the conventional Mel-Cepstrum Frequency Coefficients features.

**Graduate Research Assistant** *January 2009 - May 2009*
Electrical and Electronics Engineering Department, Eskisehir Osmangazi University
***Advisor***: Osman Parlaktuna, Ph.D.
Conducted research on autonomous parallel parking of non-holonomic vehicles. Dimensions of a parking lot is sensed by the ultrasonic sensors mounted on a vehicle. Based on the dimensions of a parking lot, parallel parking is accomplished by a few or many repetitions of circular movements.

## TEACHING EXPERIENCE

**Teaching Assistant** *September 2019 - December 2019*
Data for Development, Department of Computer Science, Stanford University
***Instructor***: David Lobell Ph.D., Marshall Burke Ph.D., Stefano Ermon Ph.D.

**Graduate Teaching Assistant** *January 2015 - May 2015*
Pattern Recognition, Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology
***Instructor***: John Kerekes, Ph.D.

**Graduate Teaching Assistant** *August 2011 - May 2012*
Programming for Imaging Science, Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology
***Instructor***: Jeff Pelz, Ph.D.

**Graduate Teaching Assistant** *August 2010 - May 2011*
Digital Image Processing, Audio Signal Processing, Speech Signal Processing
Electrical Engineering Department, University of Bridgeport
***Instructor***: Buket D. Barkana, Ph.D.

**Graduate Teaching Assistant**                                    *January 2009 - May 2009*
Non-linear Control Systems
Electrical and Electronics Engineering Department, Eskisehir Osmangazi University
*Instructor*: Osman Parlaktuna, Ph.D

## REFEREED JOURNAL PUBLICATIONS

1. **B. Uzkent**, A. Rangnekar, M.J. Hoffman, "Tracking in Aerial Hyperspectral Videos Using Deep Kernelized Correlation Filters", *In IEEE Transactions on Geoscience and Remote Sensing*, 57(1): 449-461, August 2018.

2. **B. Uzkent**, M. J. Hoffman, A. Vodacek, "Integrating Hyperspectral Likelihoods in a Multi-dimensional Assignment Algorithm for Aerial Vehicle Tracking", *IEEE Journal of Selected Topics in Remote Sensing and Observation*, 9(9): 4325-4333, May 2016.

3. **B. Uzkent**, M. J. Hoffman, A. Vodacek, Bin Chen, "Feature Matching with an Adaptive Optical Sensor in a Ground Target Tracking System", *IEEE Sensors Journal*, 15(1): 510-519, January 2015.

4. **B. Uzkent**, B.D. Barkana, H. Cevikalp, "Non-speech environmental sound classification using SVMS with a new set of features", *International Journal of Innovative Computing, Information and Control*, 8(5): 3511-3524, May 2012.

5. B.D. Barkana, **B. Uzkent**, I. Saricicek, "Normal and abnormal non-speech audio event detection using MFCC and PR-based feature sets", *Advanced Materials Research*, Volume 601, pp: 200208, December 2012.

6. B.D. Barkana, **B. Uzkent**, I. Saricicek, "Environmental noise classifier using a new set of feature parameters based on pitch range", *Applied Acoustics*, 72(11): 841848, November 2011.

7. **B. Uzkent**, B.D. Barkana, J. Yang, "Automatic environmental noise source classification model using fuzzy logic", *Expert Systems with Applications*, 38(7): 87518755, July 2011.

## REFEREED CONFERENCE PUBLICATIONS

1. **Burak Uzkent**, Stefano Ermon, "Learning Where and When to Zoom Using Deep Reinforcement Learning", *In Proceedings of the International Conference on Computer Vision and Pattern Recognition*, June 2020.

2. **Burak Uzkent**, Cristopher Yeh, Stefano Ermon, "Efficient Object Detection in Large Images Using Deep Reinforcement Learning", *In Proceedings of the IEEE Winter Conference on Applications of Computer Vision*, March 2020.

3. Vishnu Sarukkai, **Burak Uzkent**, Stefano Ermon, "Generating Cloud Free Satellite Images using Spatiotemporal Generative Networks", *In Proceedings of the IEEE Winter Conference on Applications of Computer Vision*, March 2020.

4. **B. Uzkent**, E. Sheehan, C. Meng, D. Lobell, M. Burke, S. Ermon, "Learning to Interpret Satellite Images using Wikipedia", *In Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence, IJCAI-19*, pp. 3620-3626, July 2019.

5. E. Sheehan, C. Meng, Matthew Tan, **B. Uzkent**, Neal Jean, D. Lobell, M. Burke, S. Ermon, "Predicting Economic Development using Geolocated Wikipedia Articles", *In Proceedings of the 25TH ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, pp. 2698-2706, July 2019.

6. **B. Uzkent**, Y. Seo, "EnKCF: Ensemble of Kernelized Correlation Filters for High- Speed Object Tracking", *In Proceedings of the IEEE Winter Conference on Applications of Computer Vision*, pp. 1133-1141, March 2018.

7. **B. Uzkent**, A. Rangnekar, M. J. Hoffman, A. Vodacek, "Aerial Vehicle Tracking by Adaptive Fusion of Likelihood Maps", *In Proceedings of the 13th IEEE Workshop on Perception Beyond the Visible Spectrum, In conjunction with Computer Vision and Pattern Recognition*, pp. 39-48, July 2017.

8. **B. Uzkent**, M. J. Hoffman, A. Vodacek, "Real time Target Detection and Tracking in Aerial Video using Hyperspectral Features", *In Proceedings of the 1st IEEE Workshop on Moving Cameras Meet Video Surveillance: From Body Cameras to Drones, In conjunction with Computer Vision and Pattern Recognition 2016*, pp. 36-44, June 2016.

9. **B. Uzkent**, M. J. Hoffman, A. Vodacek, "Spectral Validation of Measurements in a Vehicle Tracking DDDAS", *In Proceedings of International Conference on Computational Science*, Volume 51, pp. 2493-2502, June 2015.

10. **B. Uzkent**, M. J. Hoffman, A. Vodacek, "Background Image Understanding and Adaptive Imaging for Vehicle Tracking", *In Proceedings of the SPIE 9460, Airborne Intelligence, Surveillance, Reconnaissance (ISR) Systems and Applications XII*, pp. 94600-94607, April 2015.

11. **B. Uzkent**, M. J. Hoffman, A. Vodacek, "Efficient Integration of Spectral Features for Vehicle Tracking utilizing an Adaptive Sensor", *In Proceedings of the SPIE 9407, Video Surveillance and Transportation Imaging Applications*, pp. 940707-940717, February 2015.

12. **B. Uzkent**, M. J. Hoffman, E. Cherry, N. Cahill, "3-D MRI Cardiac Segmentation using Graph Cuts", *In Proceedings of the IEEE Western NY Image Processing Workshop*, pp. 47-51, November 2014.

13. **B. Uzkent**, M. J. Hoffman, A. Vodacek, J. P. Kerekes, B. Chen, "Feature matching and adaptive prediction models in an object tracking DDDAS", *In Procedia Computer Science*, Volume 18, pp. 1939-1948, 2013.

14. **B. Uzkent**, B.D. Barkana, "Pitch range-based feature extraction for audio surveillance systems", *In Proceedings of IEEE International Conference on Information Technology: New Generations (ITNG)*, pp. 476-480, April 2011.

15. B.D. Barkana, I. Saricicek, **B. Uzkent**, "Performances of the ANN, SVM, and K- means clustering methods recognizing different environmental sounds", *In Proceedings of the 24th European Conference on Operational Research*, Lisbon, Portugal, July 11- 14, 2010.

16. **B. Uzkent**, O. Parlaktuna, "Autonomous parallel parking of non-holonomic vehicles", *In Proceedings of the 13th National Conference in Middle East Technical University*, Ankara, Turkey, 2009.

## PREPRINTS

1. **Burak Uzkent**, Kumar Ayush, Marshall Burke, David Lobell, and Stefano Ermon, "Generating Interpretable Poverty Maps Using Convolutional Object Detectors".

2. E. Sheehan, **B. Uzkent**, C. Meng, Z. Tang, M. Burke, D. Lobell, S. Ermon, "Learning to Interpret Satellite Images in Africa Using Wikipedia".

3. **B. Uzkent**, E. Sheehan, C. Meng, Z. Tang, M. Burke, D. Lobell, S. Ermon, "Learning to Interpret Satellite Images in Global Scale Using Wikipedia".

## UNDER REVIEW

1. **Burak Uzkent**, Kumar Ayush, Marshall Burke, David Lobell, and Stefano Ermon, "Generating Interpretable Poverty Maps Using Convolutional Object Detectors", *International Joint Conference on Artifical Intelligence, August 2020*

2. Jihyeon Lee, Sicheng Zheng, **Burak Uzkent**, and Stefano Ermon, "Predicting Geo-attributes Using Deep Learning and Publicly Available Street-level Images", *International Joint Conference on Artifical Intelligence, August 2020*

3. **Burak Uzkent**, Stefano Ermon, "Domain Adaptation Using Adversarial Learning for Studying Low Resolution Images", *The International Joint Conference on Artificial Intelligence, August 2020.*

## PEER REVIEWS

IEEE Transactions on Geoscience and Remote Sensing

IEEE Transactions on Information Forensics and Security

Neural Information Processing Systems

Winter Conference on Applications of Computer Vision (WACV)

IEEE Sensors Journal

IEEE Access

IEEE Transactions on Image Processing

MDPI, Sensors

International Conference on Machine Learning

## AWARDS

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|---|---|
| RIT Graduate Scholarship Award | *September 2011 - May 2016* |
| University of Bridgeport Deans Scholarship Award | *August 2009 - May 2011* |
| University of Bridgeport Outstanding Student Award | *May 2011* |
| Fulbright Opportunity Grant | *August 2009* |
| Erasmus Exchange Student | *September 2007 - January 2008* |

## HARDWARE AND SOFTWARE SKILLS

C/C++, Python, TensorFlow, PyTorch, Caffe, OpenCV, MATLAB, Linux Shell Scripting, IDL/ENVI, LaTeX, Git, HTML

## LANGUAGE PROFICIENCY

English (Advanced), German (Beginner), Turkish (Native)