 CURRICULUM VITAE

İREM ÜLKÜ

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**PERSONAL STATEMENT**

My research is focused on developing novel machine learning and deep learning algorithms to compress, detect, segment and classify large scale datasets. Hyperspectral and multispectral images are mainly used in my research models.

**EDUCATION**

2019-2020

**IMPERIAL COLLEGE LONDON | London, UK**

**Postdoctoral Researcher: Electrical and Electronic Engineering**

Communications and Signal Processing Research Group

Supervisor: Dr. Panagiota Tania STATHAKI

Research: [*U-Net based segmentation of vegetation in satellite images. U-Net deep learning model is utilized for the semantic segmentation of multispectral images. The effects of feature extraction tools in the segmentation process are studied. These feature extraction tools can be either PCA which aims the dimentionality reduction or vegetation indices that are particularly designed to emphasize green vegetation. In addition to PCA method, the non-linear transformation counterparts are also studied since multispectral images have inherently non-linear behavior.*]

2013-2017

**ÇANKAYA UNIVERSITY | Ankara, Turkey**

**PhD: Electronic and Communication Engineering**

CumGPA: 4.00

Thesis Title: [*Hybrid Hyperspectral Image Compression using Online Dictionary Learning and Sparse Coding*]

Supervisor: Assoc. Prof. Dr. Behçet Uğur TÖREYİN (September 2013 – September 2015)

Prof. Dr. Halil Tanyer EYYUBOĞLU (September 2015 – November 2017)

2010-2013

**MIDDLE EAST TECHNICAL UNIVERSITY (METU) | Ankara, Turkey**

**MSc: Electrical and Electronics Engineering**

CumGPA: 3.09

Thesis Title: [*Analysis of Vertical Connections in Printed Structures Using Closed Form Greens Functions*]

Supervisor: Prof. Dr. Gülbin DURAL, Co-Supervisor: Assoc. Prof. Dr. Lale ALATAN

2006-2010

**ÇANKAYA UNIVERSITY | Ankara, Turkey**

**BSc: Electronic and Communication Engineering**

CumGPA: 3.93

2005-2009

**ÇANKAYA UNIVERSITY | Ankara, Turkey**

Double Major

**BSc:**  **Industrial Engineering**

**(Ranked 1st at university) (Valedictorian)**

CumGPA: 3.91

**EMPLOYMENT HISTORY**

2021 – cont‘d

**Assistant Professor**

**Ankara University, Computer Engineering Department, Ankara, Turkey**

* Conducting research and publishing papers in academic journals.
* Teaching and supervising undergraduate and graduate students.
  + COM 1001, Computer Programming I (Python)
  + COM 3551, Artificial Intelligence
  + SEUE 1020, Introduction to Web Technologies

2020 – 2021

**Dr. Instructor**

**Çankaya University, Electrical and Electronics Engineering Department, Ankara, Turkey**

* Carry out academic research for submitting papers to peer reviewed journals [9]
* Teach undergraduate level laboratory courses.

2019 – 2020

**Postdoctoral Researcher**

**Imperial College London, Electrical and Electronic Engineering Department, London, UK**

* Carry out academic research for submitting papers to peer reviewed journals [5]

2010 – 2019

**Research/Teaching Assistant**

**Çankaya University, Electrical and Electronics Engineering Department, Ankara, Turkey**

* Carry out academic research for submitting papers to peer reviewed journals [2, 3, 6, 7]
* Teach undergraduate level laboratory courses.

2009 – 2010

**Research/Teaching Assistant**

**Çankaya University, Industrial Engineering Department, Ankara, Turkey**

* Teach undergraduate level recitation courses.

**AWARDS**

* Scholarship from TÜBİTAK (The Scientific and Technological Research Council of Turkey) – 2219 Research Fellowship Programme for young post-doctoral researchers, (2019-2020) (Imperial College London)
* Scholarship from TÜBİTAK (The Scientific and Technological Research Council of Turkey) – 3501 Career Development Program (CAREER), (2014-2016) (114E200)

Title: *Online Learning based compression of hyperspectral images that are acquired for remote sensing*

* Scholarship from Çankaya University, (2005-2009)
* Ranked 1st at University in class of 900+ students, (Valedictorian), 2009)
* Electronic and Communication Engineering B.Sc. graduated with high honor, (2010)
* Industrial Engineering B.Sc. graduated with high honor, (2009)
* İzmir Institute of Technology (sponsored by TÜBİTAK and TMMOB)-“What to Produce Project Competition”, second prize, (2006)

**REVIEWER FOR JOURNALS (SCI)**

* IEEE Geoscience and Remote Sensing Letters
* Applied Optics
* Journal of the Optical Society of America A
* Optics Express
* Signal, Image and Video Processing
* International Journal of Applied Mathematics and Computer Science
* European Journal of Remote Sensing
* IETE Journal of Research
* International Journal of Computational Intelligence Systems
* Ecological Informatics

**REVIEWER FOR WORKSHOPS AND CONFERENCES**

* IEEE SIU’15, IEEE SIU’17, IEEE SIU’19

**CERTIFICATES**

* **Getting Started with AWS Machine Learning** May 2020

[View Certificate](https://coursera.org/share/d417a8522884654b77aca6623a636343) **AWS, Coursera**

* **DL0110EN: Deep Learning with Python and PyTorch** February 2020

[View Certificate](https://courses.edx.org/certificates/adea41d1093b498296381b86eddef5b5) **IBM, EdX**

* **ML0101EN: Machine Learning with Python: A Practical Introduction** April 2020

[View Certificate](https://courses.edx.org/certificates/518ab0322b194ce8ad149fb7ff324f38) **IBM, EdX**

**SKILLS**

* **Programming Languages:** C, C++, Python 3, SQL, HTML, Microsoft Visual Basic.NET
* **Deep Learning / Machine Learning Frameworks and Libraries:** CNTK, Pytorch, Numpy, Pandas, Scikit-Learn, SciPy, matplotlib
* **Software:** Matlab, Simulink, Orcad Pspice, AutoCAD, Adobe Photoshop
* **Operating Systems:** Windows, Linux
* **Big-data Platforms:** Spark
* **Computer Vision Package:** OpenCV
* **Cloud Computing Platforms:** AWS
* **Languages:**
* English:

TOEFL-IBT, 96 (2011-2012)

TOEFL-IBT, 94 (2009-2010)

* German:

B1.1

**PUBLICATIONS**

**Journal Papers (SCI):**

[1] **İ. Ülkü** and B. Uğur Töreyin, “Sparse coding of hyperspectral imagery using online learning,” Signal, Image and Video Processing, 9(4), 959-966 (2015).

[2] **İ. Ülkü** and B. Töreyin, "Sparse representations for online-learning-based hyperspectral image compression," Appl. Opt., 54(29), 8625-8631 (2015).

[3] **İ. Ülkü** and E. Kızgut, "Large-scale Hyperspectral Image Compression via Sparse Representations based on Online Learning," Int. J. Appl. Math. Comput. Sci,, 28(1), 197-207 (2018).

[4] **İ. Ülkü** and E. Kızgut, "Lossy Compressive Sensing based on Online Dictionary Learning“, Computing and Informatics, 38(1), 151-172 (2019).

[5] **İ. Ülkü** and E. Akagunduz, "A Survey on Deep Learning-based Architectures for Semantic Segmentation on 2D images“, Applied Artificial Intelligence, 36(1), 1-45 (2022).

[6] I. N. Askerzade, R. T. Askerbeyli and **I**. **Ulku,** "Effect of unconventional current-phase relation of Josephson junction on escape rate in ac SQUID", Physica C: Superconductivity and its Applications, 598, 1354068 (2022)

[7] I. N. Askerzade and **I.** **Ulku,** "Influence of anharmonic current-phase relation on the time resolution of Josephson balanced comparator", ФІЗИКА НИЗЬКИХ ТЕМПЕРАТУР, 48(9), 788-791 (2022)

[8] **İ. Ülkü**, E. Akagunduz and P. Ghamisi, "Deep Semantic Segmentation of Trees Using Multispectral Images“, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing,15, 7589-7604 (2022).

**Conference and Workshop Papers (International):**

[8] **I. Ulku**, P. Barmpoutis, T. Stathaki, E. Akagunduz, “ Comparison of Single Channel Indices for U-Net based Segmentation of Vegetation in Satellite Images,” in 12th International Conference on Machine Vision (ICMV 2019), (International Society for Optics and Photonics, 2019), Amsterdam, Netherlands (2019).

[9] **İ.Ülkü** and B.U.Töreyin, “Hyperspectral Image Compression Using an Online Learning Method,” in Proc. of SPIE Defense, Security and Sensing (DSS) Satellite Data Compression, Communications, and Processing Conference, (Internal Society for Optics and Photonics, 2015), Baltimore, Maryland, USA (2015).

[10] **İ.Ülkü** and B.U.Töreyin, “Lossy Compression of Hyperspectral Images using Online Learning Based Sparse Coding,” in Proc. of International Workshop On Computational Intelligence for Multimedia Understanding (IWCIM), (IEEE, 2014), Paris, France, pp. 1-5 (2014).

**RESEARCH INTERESTS**

Machine learning, deep learning, hyperspectral/multispectral image compression/segmentation, remote sensing.

**PROFESSIONAL DEVELOPMENT**

* **Summer School:** Artificial Intelligence İsmail Arı Summer School 2018, (Natural Language Processing and Bioinformatics), Boğaziçi University, İstanbul, Turkey.

**REFERENCES**

1. Dr. Yahya Kemal BAYKAL, y.baykal@cankaya.edu.tr (the chairman of the Electrical and Electronics Department, Çankaya University)
2. Dr. Tania STATHAKI, t.stathaki@imperial.ac.uk (reader in the Electrical and Electronic Engineering Department, Imperial College London) (postdoc supervisor)
3. Dr. Erdem AKAGÜNDÜZ, akagunduz@cankaya.edu.tr (lecturer in Graduate School of Informatics, Middle East Technical University)