Assoc. Prof. ELİF VURAL

Personal Information

Office Phone: +90 312 210 2370
Email: velif@metu.edu.tr
Web: https://eee.metu.edu.tr/personel/elif-vural

International Researcher IDs
ScholarID: IBqFKwkAAAAJ
ORCID: 0000-0002-5491-2588
Publons / Web Of Science ResearcherID: AAZ-9275-2020
ScopusID: 26645193800
Yoksis Researcher ID: 235293

Education Information

Doctorate, Ecole Polytechnique Fédérale de Lausanne, EPFL (The Federal Institute of Technology, Lausanne), Mühendislik Fakültesi, Elektrik Ve Elektronik Mühendisliği Bölümü, Switzerland 2008 - 2013
Postgraduate, Middle East Technical University, Graduate School of Natural and Applied Sciences, Elektrik Ve Elektronik Mühendisliği Bölümü, Turkey 2006 - 2008
Undergraduate Double Major, Middle East Technical University, Fen Edebiyat Fakültesi , Matematik, Turkey 2003 - 2006
Undergraduate, Middle East Technical University, Faculty of Engineering, Department of Electrical and Electronics Engineering, Turkey 2002 - 2006

Dissertations

Doctorate, Transformation-Invariant Analysis of Visual Signals with Parametric Models, Ecole Polytechnique Federale De Lausanne, 2013
Postgraduate, Robust extraction of sparse 3D points from image sequences, Middle East Technical University, Graduate School of Natural and Applied Sciences, 2008

Research Areas

Electrical and Electronics Engineering

Academic Titles / Tasks

Assistant Professor, Middle East Technical University, Faculty of Engineering, Department of Electrical and Electronics Engineering, 2015 - Continues

Courses

Engineering Design I, Undergraduate, 2020 - 2021, 2019 - 2020, 2018 - 2019, 2017 - 2018, 2016 - 2017, 2015 - 2016
Signals and Systems 1, Undergraduate, 2020 - 2021, 2019 - 2020

ENGINEERING DESIGN II, Undergraduate, 2019 - 2020, 2018 - 2019, 2017 - 2018, 2016 - 2017, 2015 - 2016

Signals and Systems II, Undergraduate, 2019 - 2020

Seminar, Postgraduate, 2018 - 2019

Graduate Seminars, Doctorate, 2018 - 2019

Probability and Stochastic Processes, Postgraduate, 2017 - 2018, 2016 - 2017, 2015 - 2016

Advising Theses

VURAL E., Estimation of time varying graph signals with graph arma processes, Postgraduate, E.TUĞÇE(Student), 2021

Vural E., ESTIMATION OF PARTIALLY OBSERVED MULTIPLE GRAPH SIGNALS BY LEARNING SPECTRALLY CONCENTRATED GRAPH KERNELS, Postgraduate, G.TURHAN(Student), 2021

Vural E., Multi-modal learning with generalizable nonlinear dimensionality reduction, Postgraduate, S.KAYA(Student), 2019

VURAL E., Domain adaptation on graphs by learning aligned graph bases, Postgraduate, M.PİLANCI(Student), 2018

VURAL E., Nonlinear supervised dimensionality reduction via smooth regular embeddings, Postgraduate, C.ÖRNEK(Student), 2018

VURAL E., Dictionary learning for efficient classification with 1-sparse representations, Postgraduate, E.ENGİN(Student), 2018

VURAL E., Clustering of manifold-modeled data based on tangent space variations, Postgraduate, G.GÖKDOĞAN(Student), 2017

ALATAN A. A., VURAL E., Spectral graph based approach for analysis of 3D LIDAR point clouds, Postgraduate, E.BAYRAM(Student), 2017

VURAL E., DIM POINT TARGET TRACKING IN INFRARED IMAGE SEQUENCES WITH LOW SNR, Postgraduate, Z.SELİN(Student), 2016

Published journal articles indexed by SCI, SSCI, and AHCI

I. **Learning Graph ARMA Processes From Time-Vertex Spectra**
Güneyi E. T., Yaldiz B., CANBOLAT A., VURAL E.
IEEE Transactions on Signal Processing, vol.72, pp.47-56, 2024 (SCI-Expanded)

II. **Domain Adaptation on Graphs by Learning Aligned Graph Bases**
Pilanci M., VURAL E.
IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING, vol.34, no.2, pp.587-600, 2022 (SCI-Expanded)

III. **Learning Multi-Modal Nonlinear Embeddings: Performance Bounds and an Algorithm**
Kaya S., VURAL E.
IEEE TRANSACTIONS ON IMAGE PROCESSING, vol.30, pp.4384-4394, 2021 (SCI-Expanded)

IV. **Mask Combination of Multi-Layer Graphs for Global Structure Inference**
Bayram E., Thanou D., VURAL E., Frossard P.
IEEE TRANSACTIONS ON SIGNAL AND INFORMATION PROCESSING OVER NETWORKS, vol.6, pp.394-406, 2020 (SCI-Expanded)

V. **Nonlinear supervised dimensionality reduction via smooth regular embeddings**
Ornek C., VURAL E.
PATTERN RECOGNITION, vol.87, pp.55-66, 2019 (SCI-Expanded)

VI. **Domain adaptation on graphs by learning graph topologies: theoretical analysis and an algorithm**
Vural E.
TURKISH JOURNAL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCES, vol.27, no.3, pp.1619-1635, 2019 (SCI-Expanded)

VII. **Analysis of Airborne LiDAR Point Clouds With Spectral Graph Filtering**
Bayram E., Frossard P., Vural E., Alatan A. A.

IEEE GEOSCIENCE AND REMOTE SENSING LETTERS, vol.15, pp.1284-1288, 2018 (SCI-Expanded)

VIII. **A Study of the Classification of Low-Dimensional Data with Supervised Manifold Learning**
VURAL E., Guillemot C.
JOURNAL OF MACHINE LEARNING RESEARCH, vol.18, pp.1-55, 2018 (SCI-Expanded)

IX. **Out-of-Sample Generalizations for Supervised Manifold Learning for Classification**
VURAL E., Guillemot C.
IEEE TRANSACTIONS ON IMAGE PROCESSING, vol.25, no.3, pp.1410-1424, 2016 (SCI-Expanded)

X. **Geometry-Aware Neighborhood Search for Learning Local Models for Image Superresolution**
Ferreira J. C., VURAL E., Guillemot C.
IEEE TRANSACTIONS ON IMAGE PROCESSING, vol.25, no.3, pp.1354-1367, 2016 (SCI-Expanded)

XI. **Analysis of Image Registration with Tangent Distance**
Vural E., Frossard P.
SIAM JOURNAL ON IMAGING SCIENCES, vol.7, no.4, pp.2860-2915, 2014 (SCI-Expanded)

XII. **Learning Smooth Pattern Transformation Manifolds**
Vural E., Frossard P.
IEEE TRANSACTIONS ON IMAGE PROCESSING, vol.22, no.4, pp.1311-1325, 2013 (SCI-Expanded)

XIII. **Analysis of Descent-Based Image Registration**
Vural E., Frossard P.
SIAM JOURNAL ON IMAGING SCIENCES, vol.6, no.4, pp.2310-2349, 2013 (SCI-Expanded)

XIV. **Discretization of Parametrizable Signal Manifolds**
Vural E., Frossard P.
IEEE TRANSACTIONS ON IMAGE PROCESSING, vol.20, no.12, pp.3621-3633, 2011 (SCI-Expanded)

Articles Published in Other Journals

I. **Tangent space estimation for smooth embeddings of Riemannian manifolds**
Tyagi H., VURAL E., Frossard P.
Information and Inference: A Journal of the IMA, vol.2, pp.69-114, 2013 (Peer-Reviewed Journal)

Refereed Congress / Symposium Publications in Proceedings

I. **An Experimental Study of the Sample Complexity of Domain Adaptation Alan Uyarlamada Örnek Karmaşikliğinin Deneysel Incelemesi**
Karaca H., Akgül Ö., Arslan Ö. F., Aydemir A. C., Aydin F. S., Ünsal E. A., VURAL E.
31st IEEE Conference on Signal Processing and Communications Applications, SIU 2023, İstanbul, Turkey, 5 - 08 July 2023

II. **Estimation of Time-Varying Graph Signals by Learning Graph Dictionaries Zamanda Değişen Graf Sinyallerinin Kestirimi için Graflarda Sözlük Öğrenme**
Acar A. B., VURAL E.
30th Signal Processing and Communications Applications Conference, SIU 2022, Safranbolu, Turkey, 15 - 18 May 2022

III. **Estimation of Locally Stationary Graph Processes from Incomplete Realizations**
CANBOLAT A., VURAL E.
32nd IEEE International Workshop on Machine Learning for Signal Processing, MLSP 2022, Xian, China, 22 - 25 August 2022, vol.2022-August

IV. **Learning Time-Vertex Dictionaries for Estimating Time-Varying Graph Signals**
Acar A. B., VURAL E.
32nd IEEE International Workshop on Machine Learning for Signal Processing, MLSP 2022, Xian, China, 22 - 25 August 2022, vol.2022-August

V. **Learning Narrowband Graph Spectral Kernels for Graph Signal Estimation Çizge Sinyallerinin Dar Bantli Spektral Kernel Öğrenimi ile Kestirimi**
Furkan Kar O., Turhan G., VURAL E.
30th Signal Processing and Communications Applications Conference, SIU 2022, Safranbolu, Turkey, 15 - 18 May 2022

VI. **Learning Graph Signal Representations with Narrowband Spectral Kernels**
Kar O. F., Turhan G., VURAL E.
32nd IEEE International Workshop on Machine Learning for Signal Processing, MLSP 2022, Xian, China, 22 - 25 August 2022, vol.2022-August

VII. **Investigation of Stationarity for Graph Time Series Data Sets**
Güneyi E. T., Vural E.
2020 28th Signal Processing and Communications Applications Conference (SIU), 5 - 07 October 2020, pp.1-4

VIII. **A Theoretical Analysis of Multi-Modal Representation Learning with Regular Functions**
Vural E.
2020 28th Signal Processing and Communications Applications Conference (SIU), Gaziantep, Turkey, 5 - 07 October 2020, pp.1-4

IX. **Learning Parametric Time-Vertex Graph Processes from Incomplete Realizations**
Guneyi E. T., CANBOLAT A., VURAL E.
31st IEEE International Workshop on Machine Learning for Signal Processing, MLSP 2021, Gold-Coast, Australia, 25 - 28 October 2021, vol.2021-October

X. **Estimating Partially Observed Graph Signals by Learning Spectrally Concentrated Graph Kernels**
Turhan G., VURAL E.
31st IEEE International Workshop on Machine Learning for Signal Processing, MLSP 2021, Gold-Coast, Australia, 25 - 28 October 2021, vol.2021-October

XI. **Multi-Modal Learning With Generalizable Nonlinear Dimensionality Reduction**
KAYA S., VURAL E.
2019 IEEE International Conference on Image Processing (ICIP), Taipei, Taiwan, 22 - 25 September 2019, pp.2139-2143

XII. **Domain Adaptation on Graphs via Frequency Analysis**
Pilancı M., Vural E.
2019 27th Signal Processing and Communications Applications Conference (SIU), Sivas, Turkey, 24 - 26 April 2019, pp.1-4

XIII. **Cross-modal Representation Learning with Nonlinear Dimensionality Reduction**
Kaya S., Vural E.
2019 27th Signal Processing and Communications Applications Conference (SIU), Sivas, Turkey, 24 - 26 April 2019, pp.1-4

XIV. **Domain Adaptation with Nonparametric Projections**
Vural E.
2019 27th Signal Processing and Communications Applications Conference (SIU), Sivas, Turkey, 24 - 26 April 2019, pp.1-4

XV. **Learning Semi-Supervised Nonlinear Embeddings for Domain-Adaptive Pattern Recognition**
VURAL E.
International Conference on Advanced Technologies, Computer Engineering and Science (ICATCES 2019), Antalya, Alanya, Turkey, 26 - 28 April 2019, pp.295-299

XVI. **GENERALIZATION BOUNDS FOR DOMAIN ADAPTATION VIA DOMAIN TRANSFORMATIONS**
VURAL E.
IEEE 28th International Workshop on Machine Learning for Signal Processing (MLSP), Aalborg, Denmark, 17 - 20 September 2018

XVII. **GENERALIZABLE SUPERVISED MANIFOLD LEARNING VIA LIPSCHITZ CONTINUOUS INTERPOLATORS**
Ornek C., VURAL E.
IEEE 28th International Workshop on Machine Learning for Signal Processing (MLSP), Aalborg, Denmark, 17 - 20

September 2018

XVIII.   **PROGRESSIVE CLUSTERING OF MANIFOLD-MODELED DATA BASED ON TANGENT SPACE VARIATIONS**
Gokdogan G., VURAL E.
27th IEEE International Workshop on Machine Learning for Signal Processing (MLSP), Tokyo, Japan, 25 - 28
September 2017

XIX.   **A Graph Signal Filtering Based Approach for Detection of Different Edge Typeson Airborne LiDAR Data**
Bayram E., Vural E., Alatan A. A.
Conference on Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing XIII,
Warszawa, Poland, 11 - 12 September 2017, vol.10429

XX.   **DOMAIN ADAPTATION VIA TRANSFERRING SPECTRAL PROPERTIES OF LABEL FUNCTIONS ON GRAPHS**
Pilanci M., VURAL E.
12th IEEE Image, Video, and Multidimensional Signal Processing Workshop (IVMSP), Bordeaux, France, 11 - 12
July 2016

XXI.   **A performance study of the tangent distance method in transformation-invariant image classification**
VURAL E., Frossard P.
2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), South Brisbane,
Queensland, Australia, Australia, 19 - 24 April 2015, pp.5773-5777

XXII.   **TRANSFORMATION-INVARIANT DICTIONARY LEARNING FOR CLASSIFICATION WITH 1-SPARSE REPRESENTATIONS**
Yuzuguler A. C., Vural E., Frossard P.
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Florence, Italy, 4 - 09 May
2014

XXIII.   **Analysis of Hierarchical Image Alignment with Descent Methods**
Vural E., Frossard P.
10th International Conference on Sampling Theory and Applications, Bremen, Germany, 1 - 05 July 2013

XXIV.   **Tangent Space Estimation Bounds for Smooth Manifolds**
Tyagi H., Vural E., Frossard P.
10th International Conference on Sampling Theory and Applications, Bremen, Germany, 1 - 05 July 2013

XXV.   **Learning pattern transformation manifolds for classification**
VURAL E., Frossard P.
2012 19th IEEE International Conference on Image Processing, Orlando, FL, USA, United States Of America, 30
September - 03 October 2012, pp.1165-1168

XXVI.   **Alignment of uncalibrated images for multi-view classification**
Arık S. Ö., VURAL E., Frossard P.
2011 18th IEEE International Conference on Image Processing, Brussels, Belgium, Belgium, 11 - 14 September
2011, pp.2365-2368

XXVII.   **Approximation of pattern transformation manifolds with parametric dictionaries**
VURAL E., Frossard P.
2011 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Prague, Czech Republic,
Czech Republic, 22 - 27 May 2011, pp.977-980

XXVIII.   **Learning Pattern Transformation Manifolds with Parametric Atom Selection**
Vural E., Frossard P.
9th International Conference on Sampling Theory and Applications, Singapore, Singapore, 2 - 06 May 2011

XXIX.   **Curvature analysis of pattern transformation manifolds**
VURAL E., Frossard P.
2010 IEEE International Conference on Image Processing, Hong Kong, Hong Kong, Hong Kong, 26 - 29 September
2010, pp.2689-2692

XXX.   **Distance-based discretization of parametric signal manifolds**
VURAL E., Frossard P.

2010 IEEE International Conference on Acoustics, Speech and Signal Processing, Dallas, TX, USA, United States Of America, 14 - 19 March 2010, pp.3574-3577

XXXI. **Outlier removal for sparse 3D reconstruction from video**

VURAL E., ALATAN A. A.

3DTV Conference - True Vision - Capture, Transmission and Display of 3D Video, İstanbul, Turkey, 28 - 30 May 2008, pp.321-324

Scientific Refereeing

NEURAL NETWORKS, Journal Indexed in SCI-E, May 2020

IEEE ACCESS, Journal Indexed in SCI-E, May 2020

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, May 2020

IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING, Journal Indexed in SCI-E, April 2020

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, March 2020

JOURNAL OF COMPUTATIONAL AND APPLIED MATHEMATICS, Journal Indexed in SCI-E, February 2020

INFORMATION FUSION, Journal Indexed in SCI-E, December 2019

IEEE TRANSACTIONS ON CYBERNETICS, Journal Indexed in SCI-E, December 2019

IEEE Access, Journal Indexed in SCI-E, November 2019

IEEE TRANSACTIONS ON CYBERNETICS, Journal Indexed in SCI-E, November 2019

IEEE TRANSACTIONS ON CYBERNETICS, Journal Indexed in SCI-E, September 2019

IEEE TRANSACTIONS ON SIGNAL AND INFORMATION PROCESSING OVER NETWORKS, Journal Indexed in SCI-E, September 2019

PATTERN RECOGNITION, Journal Indexed in SCI-E, May 2019

PATTERN RECOGNITION, Journal Indexed in SCI-E, April 2019

IEEE TRANSACTIONS ON CYBERNETICS, Journal Indexed in SCI-E, April 2019

IEEE TRANSACTIONS ON IMAGE PROCESSING, SCI Journal, December 2018

IEEE TRANSACTIONS ON IMAGE PROCESSING, SCI Journal, December 2018

NEURAL PROCESSING LETTERS, SCI Journal, November 2018

JOURNAL OF ELECTRONIC IMAGING, SCI Journal, February 2018

DIGITAL SIGNAL PROCESSING, Journal Indexed in SCI-E, December 2017

DIGITAL SIGNAL PROCESSING, Journal Indexed in SCI-E, July 2016

IEEE SIGNAL PROCESSING LETTERS, Journal Indexed in SCI-E, March 2016

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, February 2015

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, January 2015

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, November 2014

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, September 2013

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, September 2013

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, September 2012

IEEE TRANSACTIONS ON IMAGE PROCESSING, Journal Indexed in SCI-E, February 2012

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