Aykut Erdem

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Brief Bio

Aykut Erdem earned his BSc and MSc degrees from Middle East Technical University (METU) in 2001 and 2003, respectively. During his PhD studies, he spent a summer at Virginia Tech as a visiting researcher, and a semester at MIT as a visiting scholar. He received his PhD in 2008 from the Computer Engineering Department at METU. After that, he worked at the Computer Science Department of Ca'Foscari University of Venice in Italy as a postdoctoral researcher, and then at Hacettepe University where he was one of the directors of the Computer Vision Lab. He joined the Department of Computer Engineering at Koç University as an an Associate Professor in 2020. His research interests span a diverse set of topics, ranging from image editing to visual saliency estimation, and to multimodal learning for integrated vision and language.

PhD in Computer Engineering
09/2003–10/2008
METU, Ankara, Turkey

MSc in Computer Engineering
09/2001–07/2003
METU, Ankara, Turkey

BSc in Computer Engineering
09/1997–06/2001
METU, Ankara, Turkey

Experience

- **Associate Professor**[1,2], 09/2020 – now
  Department of Computer Engineering, School of Engineering, Koç University, Sariyer, Istanbul, Turkey
- **Associate Professor**[3,4] 04/2018 – 08/2020
  Department of Computer Engineering, Hacettepe University, Beytepe, Ankara, Turkey
- **Assistant Professor** 12/2011 – 04/2018
  Department of Computer Engineering, Hacettepe University, Beytepe, Ankara, Turkey
- **Instructor** 11/2010 – 12/2011
  Department of Geodesy and Photogrammetry, Hacettepe University, Beytepe, Ankara, Turkey
- **Post-doctoral Researcher**[5] 11/2008 – 03/2010
  Dipartimento di Informatica, Universitá Ca' Foscari di Venezia, Venice, Italy

[1] Affiliated faculty at Koç University and İş Bankası Artificial Intelligence Laboratory (KUIS AI Lab).

[2] Taught courses on *computer systems and programming*

[3] A co-founder of Hacettepe University Computer Vision Lab (HUCVL).

[4] Taught courses on *introductory programming*, *logical design*, *programming languages*, *systems programming*, *machine learning*, *image processing*, *computer vision*, *machine learning learning* and *deep learning*.

[5] Sponsored by EU-FP7 SIMBAD (Beyond Features: Similarity-Based Pattern Analysis and Recognition) Project.

- **Visiting Student**[6], 09/2007 – 11/2007
  Department of Architecture, Computation Group, MIT, Cambridge, USA
- **Visiting Student**[7] 07/2006
  Department of Mathematics, Northeastern University, Boston, USA
- **Visiting Research Scholar**[8] 07/2004 – 08/2004
  Virginia Bioinformatics Institute, Virginia Polytechnic Institute and State University, Virginia, USA
- **Teaching Assistant**[9] 12/2001 – 09/2008
  Department of Computer Engineering, Middle East Technical University, Ankara, Turkey

[6] Visited Prof. George Stiny (sponsored by TUBITAK Program 2214 – Research Fellowship Program for PhD Students).

[7] Visited Prof. Jayant Shah.

[8] Worked with Volkan Atalay and Rengul Cetin-Atalay.

[9] Assisted courses include *image processing*, *dynamic systems*, *scientific computing*, *logic for CS*, and *computer graphics*.

Publications

My Erdos number is 3 (via 1. Arun Kumar Jagota, 2. Marcello Pelillo).

Journal Articles

1. Aarohi Srivastava, Abhinav Rastogi, Abhishek Rao, Abu Awal Md Shoeb, et al., "Beyond the Imitation Game: Quantifying and extrapolating the capabilities of language models", *Transactions on Machine Learning Research*, April 2023.
2. Aysun Kocak, Erkut Erdem, Aykut Erdem, "A Gated Fusion Network for Dynamic Saliency Prediction", *IEEE Transactions on Cognitive and Developmental Systems*, Vol. 14, Issue 3, pp. 995-1008, September 2022.
3. Erkut Erdem, Menekse Kuyu, Semih Yagcioglu, Anette Frank, Letitia Parcalabescu, Andrii Babii, Oleksii Turuta, Aykut Erdem, Iacer Calixto, Barbara Plank, Elena Lloret, Elena-Simona Apostol, Ciprian-Octavian Truică, Branislava Šandrih, Sanda Martinčić-Ipšić, Gábor Berend, Albert Gatt, Grazina Korvel, "Neural Natural Language Generation: A Survey on Multilinguality, Multimodality, Controllability and Learning", *Journal of Artificial Intelligence Research*, Vol. 73, pp. 1131-1207, April 2022.
4. Kemal Cizmeciler, Erkut Erdem, Aykut Erdem, "Leveraging semantic saliency maps for query-specific video summarization", *Multimedia Tools and Applications*, March 2022.
5. Ahmet Serdar Karadeniz, Erkut Erdem, Aykut Erdem, "Burst Photography for Learning to Enhance Extremely Dark Images", *IEEE Transactions on Image Processing*, Vol. 30, pg. 9372-9385, November 2021.
6. Murat Ture, M. Ege Ciklabakkal, Aykut Erdem, Erkut Erdem, Pinar Satilmis, Ahmet Oguz Akyuz, "From Noon to Sunset: Interactive Rendering, Relighting, and Recoloring of Landscape Photographs by Modifying Solar Position", Computer Graphics Forum, Vol. 40, Issue 6, pp. 500-515, September 2021.
7. Begum Citamak, Ozan Caglayan, Menekse Kuyu, Erkut Erdem, Aykut Erdem, Pranava Madhyastha, Lucia Specia, "MSVD-Turkish: A Comprehensive Multimodal Video Dataset for Integrated Vision and Language Research in Turkish", *Machine Translation*, Vol. 35, 265-288, June 2021.
8. Onur Can Uner, Cem Aslan, Burak Ercan, Tayfun Ates, Ufuk Celikcan, Aykut Erdem, Erkut Erdem, "Synthetic18K: Learning better representations for person re-ID and attribute recognition from 1.4 million synthetic images", *Signal Processing: Image Communication*, Vol. 97, September 2021.
9. Abdulrahman Haje Kerim, Cem Aslan, Ufuk Celikcan, Erkut Erdem, Aykut Erdem, "NOVA: Rendering Virtual Worlds with Humans for Computer Vision Tasks", Computer Graphics Forum, Vol. 40, Issue 6, pp. 258-272, September 2021.

10. Abdulrahman Kerim, Ufuk Celikcan, Erkut Erdem, Aykut Erdem, "Using Synthetic Data for Person Tracking Under Adverse Weather Conditions", *Image and Vision Computing*, Vol. 111, July 2021.
11. Emre Boran, Aykut Erdem, Nazli Ikizler-Cinbis, Erkut Erdem, Pranava Madhyastha, Lucia Specia, "Leveraging auxiliary image descriptions for dense video captioning", *Pattern Recognition Letters*, Vol. 146, June 2021.
12. Mahmut Yurt, Salman UH Dar, Aykut Erdem, Erkut Erdem, Kader K. Oguz, Tolga Cukur, "mustGAN: multi-stream Generative Adversarial Networks for MR Image Synthesis", *Medical Image Analysis*, Vol. 70, May 2021.
13. Bora Celikkale, Goksu Erdogan, Aykut Erdem, and Erkut Erdem, "Generating Visual Story Graphs with Application to Photo Album Summarization", *Signal Processing: Image Communication*, Vol. 90, January 2021.
14. Yasin Kavak, Erkut Erdem, and Aykut Erdem, "Hedging Static Saliency Models to Predict Dynamic Saliency", *Signal Processing: Image Communication*, Vol. 81, February 2020.
15. Levent Karacan, Zeynep Akata, Aykut Erdem, and Erkut Erdem, "Manipulating Attributes of Natural Scenes via Hallucination", *ACM Transactions on Graphics*, Vol. 39, Issue 1, Article 7, February 2020.
16. Salman Ul Hassan Dar, Mahmut Yurt, Levent Karacan, Aykut Erdem, Erkut Erdem, Tolga Cukur, "Image Synthesis in Multi-Contrast MRI with Conditional Generative Adversarial Networks", *IEEE Transactions on Medical Imaging*, Vol. 38, Issue 10, pp. 2375-2388, October 2019.
17. Cagdas Bak, Aysun Kocak, Erkut Erdem, and Aykut Erdem, "Spatio-Temporal Saliency Networks for Dynamic Saliency Prediction", *IEEE Transactions on Multimedia*, Vol. 20, Issue 7, pp. 1688-1698, July 2018.
18. Levent Karacan, Aykut Erdem, and Erkut Erdem, "Alpha Matting with KL-Divergence Based Sparse Sampling", *IEEE Transactions on Image Processing*, Vol. 26, Issue 9, pp. 4523-4536, September 2017.
19. Mert Kilickaya, Burak Kerim Akkus, Ruket Cakici, Aykut Erdem, Erkut Erdem, and Nazli Ikizler-Cinbis, "Data-driven image captioning via salient region discovery", *IET Computer Vision*, Vol. 11, Issue 6, pp. 398-406, September 2017.
20. Yasin Kavak, Erkut Erdem, and Aykut Erdem, "A Comparative Study for Feature Integration Strategies in Dynamic Saliency Estimation", *Signal Processing: Image Communication*, Vol. 51, pp. 13-25, February 2017.
21. Aykut Erdem, "Structure-Texture Decomposition of RGB-D Images", *International Journal of Intelligent Systems and Applications in Engineering*, Vol. 4, No. 4, pp. 111-118, October 2016.
22. Osman Akin, Erkut Erdem, Aykut Erdem, and Krystian Mikolajczyk, "Deformable Part-based Tracking by Coupled Global and Local Correlation Filters", *Journal of Visual Communication and Image Representation*, Vol. 38, pp. 763-774, July 2016.
23. Okan Tarhan Tursun, Ahmet Oguz Akyuz, Aykut Erdem, and Erkut Erdem, "An Objective Deghosting Quality Metric for HDR Images", *Computer Graphics Forum*, Vol. 35, Issue 2, pp. 139-152, May 2016.
24. Raffaella Bernardi, Ruket Cakici, Desmond Elliott, Aykut Erdem, Erkut Erdem, Nazli Ikizler-Cinbis, Frank Keller, Adrian Muscat, and Barbara Plank, "Automatic Description Generation from Images: A Survey of Models, Datasets, and Evaluation Measures", *Journal of Artificial Intelligence Research*, Vol. 55, pp. 409-442, February 2016.

25. Bora Celikkale, Aykut Erdem and Erkut Erdem, "Predicting Memorability of Images Using Attention-driven Spatial Pooling and Image Semantics", *Image and Vision Computing*, Vol. 42, pp. 35-46, October 2015.
26. Okan Tarhan Tursun, Ahmet Oguz Akyuz, Aykut Erdem and Erkut Erdem, "The State of the Art in HDR Deghosting: A Survey and Evaluation", *Computer Graphics Forum*, Vol. 34, Issue 2, pp. 683-707, May 2015.
27. Levent Karacan, Erkut Erdem and Aykut Erdem, "Structure-Preserving Image Smoothing via Region Covariances", *ACM Transactions on Graphics* (*Proceedings of SIGGRAPH Asia 2013*), Vol. 32, Issue 6, November 2013.
28. Erkut Erdem and Aykut Erdem, "Visual saliency estimation by nonlinearly integrating features using region covariances", *Journal of Vision*, Vol. 13, Issue 4, Article 11, March 2013.
29. Aykut Erdem and Marcello Pelillo, "Graph Transduction as a Non-Cooperative Game", *Neural Computation*, Vol. 24, No. 3, pp. 700-723, March 2012.
30. Aykut Erdem and Sibel Tari, "A similarity-based approach for shape classification using Aslan skeletons", *Pattern Recognition Letters*, Vol. 31, Issue 13, pp. 2024-2032, October 2010.
31. Emre Baseski, Aykut Erdem and Sibel Tari, "Dissimilarity Between Two Skeletal Trees in a Context", *Pattern Recognition*, Vol. 42, Issue 3, pp. 370-385, March 2009.
32. Cagri Aslan, Aykut Erdem, Erkut Erdem and Sibel Tari, "Disconnected Skeleton: Shape at its Absolute Scale", *IEEE Trans. Pattern Anal. Mach. Intell.*, Vol. 30, No. 12, pp. 2188-2203, December 2008.
33. Aykut Erdem, Erkut Erdem, Volkan Atalay and A. Enis Cetin, "Vision-based continuous Graffiti-like text entry system", *Optical Engineering*, Vol. 43, Issue 3, pp. 553-558, March 2004.

Conference/Workshop Publications

1. Nafiseh Tofighi, M. Hedi Elfkir, Nevrez Imamoglu, Cagri Ozcinar, Erkut Erdem, Aykut Erdem, "ST360IQ: No-Reference Omnidirectional Image Quality Assessment with Spherical Vision Transformers", *2023 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2023)*, Greece, June 2023.
2. Ilker Kesen, Aykut Erdem, Erkut Erdem and Iacer Calixto, "Detecting Euphemisms with Literal Descriptions and Visual Imagery", *The Third Workshop on Figurative Language Processing (FigLang 2022)* – in conjunction with EMNLP 2022, Abu Dhabi, December 2022.
3. Levent Karacan, Tolga Kerimoğlu, I. Ata Inan, Tolga Birdal, Erkut Erdem, Aykut Erdem, "Disentangling Content and Motion for Text-Based Neural Video Manipulation", *The 33rd British Machine Vision Conference (BMVC)*, London, UK, November 2022.
4. Cansu Korkmaz, A. Murat Tekalp, Zafer Doğan, Erkut Erdem, Aykut Erdem, "Perception-Distortion Tradeoff in the SR Space Spanned by Flow Models", *The 29th IEEE International Conference on Image Processing (IEEE ICIP)*, Bordeaux, France, October 2022.
5. Ilker Kesen, Ozan Arkan Can, Erkut Erdem, Aykut Erdem, Deniz Yuret, "Modulating Bottom-Up and Top-Down Visual Processing via Language-Conditional Filters", *5th Multimodal Learning and Applications Workshop (MULA 2022)* – in conjunction with CVPR 2022 (**Best Paper Award**), New Orleans, USA, June 2022.

6. Anabela Barreiro, José GC de Souza, Albert Gatt, Mehul Bhatt, Elena Lloret, Aykut Erdem, Dimitra Gkatzia, Helena Moniz, Irene Russo, Fabio Kepler, Iacer Calixto, Marcin Paprzycki, François Portet, Isabelle Augenstein, Mirela Alhasani, "Multi3Generation: Multitask, Multilingual, Multimodal Language Generation", *23rd Annual Conference of the European Association for Machine Translation (EAMT 2022)*, Ghent, Belgium, June 2022.
7. Tayfun Ates, Muhammed Samil Atesoglu, Cagatay Yigit, Ilker Kesen, Mert Kobas, Erkut Erdem, Aykut Erdem, Tilbe Goksun, Deniz Yuret, "CRAFT: A Benchmark for Causal Reasoning About Forces and inTeractions", *Findings of the Association for Computational Linguistics (ACL 2022)*, May 2022.
8. Adil Kaan Akan, Erkut Erdem, Aykut Erdem, Fatma Guney, "SLAMP: Stochastic Latent Appearance and Motion Prediction", *IEEE International Conference on Computer Vision (ICCV 2021)*, Virtual, October 2021.
9. Mert Cokelek, Nevrez Imamoglu, Cagri Ozcinar, Erkut Erdem, Aykut Erdem, "Leveraging Frequency Based Salient Spatial Sound Localization to Improve 360° Video Saliency Prediction", *The 17th International Conference on Machine Vision Applications (MVA 2021)*, Nagoya, Japan, July 2021.
10. Ozan Caglayan, Menekse Kuyu, Mustafa Sercan Amac, Pranava Madhyastha, Erkut Erdem, Aykut Erdem, Lucia Specia, "Cross-lingual Visual Pre-training for Multimodal Machine Translation", *The 16th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2021)*, Kyiv, Ukraine, April 2021.
11. Tayfun Ates, Muhammed Samil Atesoglu, Cagatay Yigit, Ilker Kesen, Mert Kobas, Erkut Erdem, Aykut Erdem, Tilbe Goksun, Deniz Yuret, "CRAFT: A Benchmark for Causal Reasoning About Forces and inTeractions", 2nd Workshop on Shared Visual Representations in Human and Machine Intelligence (SVRHM) at 34th Conference on Neural Information Processing Systems (NeurIPS 2020), December 2020.
12. Ahmet E. Tekden, Aykut Erdem, Erkut Erdem, Mert Imre, M. Yunus Seker, Emre Ugur, "Belief Regulated Dual Propagation Nets for Learning Action Effects on Articulated Multi-Part Objects", International Conference on Robotics and Automation (ICRA 2020), Paris, France, May 2020.
13. Levent Karacan, Mehmet Gunel, Aykut Erdem, Erkut Erdem, "Manipulating Person Videos with Natural Language", Sets & Partitions Workshop at 33rd Conference on Neural Information Processing Systems (NeurIPS 2019), Vancouver, Canada, December 2019.
14. Mustafa Sercan Amac, Semih Yagcioglu, Aykut Erdem, and Erkut Erdem, "Procedural Reasoning Networks for Understanding Multimodal Procedures", *The SIGNLL Conference on Computational Natural Language Learning (CoNLL 2019)*, Hong Kong, November 2019.
15. Yunus Emre Ozkose, Bora Celikkale, Aykut Erdem, and Erkut Erdem, "Diverse Neural Photo Album Summarization", *International Conference on Image Processing Theory, Tools and Applications (IPTA)*, Istanbul, November 2019.
16. Semih Yagcioglu, Aykut Erdem, Erkut Erdem, and Nazli Ikizler-Cinbis, "RecipeQA: A Challenge Dataset for Multimodal Comprehension of Cooking Recipes", *2018 Conference on Empirical Methods in Natural Language Processing (EMNLP 2018)*, Brussels, Belgium, October 2018.
17. Mehmet Gunel, Erkut Erdem, and Aykut Erdem, "Language guided fashion image manipulation with feature-wise transformations", First Workshop on Computer Vision in Art, Fashion and Design) – in conjunction with ECCV 2018, Munich, Germany, September 2018

18. Hazal Lezki, I. Ahu Ozturk, M. Akif Akpinar, M. Kerim Yucel, K. Berker Logoglu, Aykut Erdem, and Erkut Erdem, "Joint Exploitation of Features and Optical Flow for Real-Time Moving Object Detection on Drones", *2nd International Workshop on Computer Vision for UAVs – in conjunction with ECCV 2018*, Munich, Germany, September 2018.
19. K. Berker Logoglu, Hazal Lezki, M. Kerim Yucel, Ahu Ozturk, Alper Kucukkomurler, Batuhan Karagoz, Erkut Erdem, and Aykut Erdem, "Feature-Based Efficient Moving Object Detection for Low-Altitude Aerial Platforms", *1st International Workshop on Computer Vision for UAVs – in conjunction with ICCV 2017*, Venice, Italy, October 2017.
20. Raffaella Bernardi, Ruket Cakici, Desmond Elliott, Aykut Erdem, Erkut Erdem, Nazli Ikizler-Cinbis, Frank Keller, Adrian Muscat, and Barbara Plank, "Automatic Description Generation from Images: A Survey of Models, Datasets, and Evaluation Measures", *International Joint Conference on Artificial Intelligence (IJCAI 2017)*, Journal track, Melbourne, Australia, August 2017.
21. Mert Kilickaya, Aykut Erdem, Nazli Ikizler-Cinbis, and Erkut Erdem, "Re-evaluating Automatic Metrics for Image Captioning", *The 15th Conference of the European Chapter of the Association for Computational Linguistics (EACL 2017)*, Valencia, Spain, April 2017.
22. Mert Kilickaya, Nazli Ikizler-Cinbis, Erkut Erdem, and Aykut Erdem, "Leveraging Captions in the Wild to Improve Object Detection", *The 5th Workshop on Vision and Language (VL'16) – in conjuction with ACL 2016*, Berlin, Germany, August 2016.
23. Levent Karacan, Aykut Erdem, and Erkut Erdem, "Image Matting with KL-Divergence Based Sparse Sampling", *IEEE International Conference on Computer Vision (ICCV 2015)*, Santiago, Chile, December 2015.
24. Semih Yagcioglu, Erkut Erdem, Aykut Erdem, and Ruket Cakici, "A Distributed Representation Based Query Expansion Approach for Image Captioning", *The 53rd Annual Meeting of the Association for Computational Linguistics (ACL 2015)*, Beijing, China, July 2015.
25. Semih Yagcioglu, Erkut Erdem, and Aykut Erdem, "City Scale Image Geolocalization via Dense Scene Alignment", *IEEE Winter Conference on Applications of Computer Vision (WACV 2015)*, Hawai, USA, January 2015.
26. Aysun Kocak, Kemal Cizmeciler, Aykut Erdem, and Erkut Erdem, "Top down saliency estimation via superpixel-based discriminative dictionaries", *British Machine Vision Conference (BMVC 2014)*, Nottingham, UK, September 2014.
27. Yasin Kavak, Erkut Erdem, and Aykut Erdem, "Visual saliency estimation by integrating features using multiple kernel learning", *6th International Symposium on Attention in Cognitive Systems (ISACS 2013)*, Beijing, China, August 2013.
28. Bora Celikkale, Aykut Erdem, and Erkut Erdem, "Visual Attention-driven Spatial Pooling for Image Memorability", *IEEE Computer Vision and Pattern Recognition Workshops (CVPRW 2013)*, Portland, Oregon, USA, June 2013.
29. Aykut Erdem and Erkut Erdem, "Multiple-Instance Learning with Instance Selection via Dominant Sets", *1st International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD 2011)*, Venice, Italy, Springer LNCS, Vol. 7005, pp. 177-191, September 2011.
30. Aykut Erdem and Marcello Pelillo, "Graph Transduction as a Non-cooperative Game", *8th IAPR -TC-15 Workshop on Graph-based Representations in Pattern Recognition (GbR 2011)*, Munster, Germany, Springer LNCS, Vol. 6658, pp. 195-204, May 2011.

31. Aykut Erdem and Andrea Torsello, "A Game Theoretic Approach To Jointly Learn Shape Categories and Contextual Similarities", *Joint IAPR International Workshop on Structural, Syntactic, and Statistical Pattern Recognition (SSPR&SPR 2010)*, Cesme, Izmir, Turkey, Springer LNCS, Vol. 6218, pp. 139-148, August 2010.
32. Aykut Erdem and Sibel Tari, "Coarse-to-Fine Matching of Shapes Using Disconnected Skeletons by Learning Class-Specific Boundary Deformations", *7th IAPR -TC-15 Workshop on Graph-based Representations in Pattern Recognition (GbR 2009)*, Venice, Italy, Springer LNCS, Vol. 5534, pp. 21-30, May 2009.
33. Erkut Erdem, Aykut Erdem, and Sibel Tari, "Edge Strength Functions as Shape Priors in Image Segmentation", *5th International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR 2005)*, Florida, USA, Springer LNCS, Vol. 3757, pp. 490-502, November 2005.
34. Aykut Erdem, Erkut Erdem, and Sibel Tari, "Articulation Prior in an Axial Representation", *International Workshop on the Representation and Use of Prior Knowledge in Computer Vision – in conjuction with ECCV 2006*, Graz, Austria, pp. 1-14, May 2006.
35. Erkut Erdem, Aykut Erdem, Volkan Atalay, and A. Enis Cetin, "Computer Vision Based Unistroke Keyboard System and Mouse for the Handicapped", *IEEE International Conference on Multimedia and Expo 2003 (ICME 2003)*, Baltimore, USA, Volume 2, pp. 765-768, July 2003.
36. Aykut Erdem, Erkut Erdem, Volkan Atalay, and A. Enis Cetin, "Computer Vision Based Unistroke Keyboards", *7th International Symposium On Computer and Information Sciences (ISCIS 2002)*, Florida, USA, pp. 210-214, October 2002.

National Conference Publications

1. Idil Aytekin, Onat Dalmaz, Salman Ul Hassan Dar, Aykut Erdem, Erkut Erdem, Tolga Cukur, "Çoklu-Kontrast MRG'de Kanal-Değişim-Ağı ile Görüntü Sentezi (Multi-Contrast MRI Synthesis with Channel-Exchanging-Network)", *30. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2022)*, Safranbolu, Mayıs 2022.
2. Begum Citamak, Menekse Kuyu, Aykut Erdem, Erkut Erdem, "MSVD-Türkçe: Türkçe Video Altyazılama için Geniş Ölçekli Bir Veri Kümesi (MSVD-Turkish: A Large-Scale Dataset for Video Captioning in Turkish)", *27. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2019)*, Sivas, Nisan 2019.
3. M. Sercan Amac, Aykut Erdem, Erkut Erdem, "Derin Modellerin Eğitiminde Uygulanan Yöntemlerin Giysi Niteliklerinin Tespiti Üzerinde Kıyaslamalı Bir Analizi (A Comparative Analysis of Practices in Training Deep Models for Fashion Attribute Detection)", *27. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2019)*, Sivas, Nisan 2019.
4. Mehmet Günel, Erkut Erdem, Aykut Erdem, "Kişi Görüntülerinin Nitelik Esaslı Üretilmesi (Generating Person Images Based on Attributes)", *26. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2018)*, Çeşme, Mayıs 2018.
5. Ali Yunus Emre Özköse, Tarık Ayberk Yılıkoğlu, Levent Karacan, Aykut Erdem, "Derin Öğrenmeyle Bir Fotoğrafın Yerini Bulma (Finding Location of A Photograph with Deep Learning)", *26. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2018)*, Çeşme, Mayıs 2018.
6. Menekşe Kuyu, Aykut Erdem, Erkut Erdem, "Altsözcük Öğeleri ile Türkçe Görüntü Altyazılama (Image Captioning in Turkish using Subword Units)", *26. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2018)*, Çeşme, Mayıs 2018.

7. Levent Karacan, Aykut Erdem, Erkut Erdem, "Çekismeli Üretici Ağlar Kullanarak Dış Mekan Görüntülerinin Geçici Niteliklerini Düzenleme (Adjusting Transient Attributes of Outdoor Images using Generative Adversarial Networks)", *25. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2017)*, Antalya, Mayıs 2017.
8. Cem Gungor, Fatih Baltacı, Aykut Erdem, Erkut Erdem, "Türk Sofrasi: Yemek Tanıma için Türk Yemekleri Barındıran Bir Denektaşı Veri Kümesi (Turkish Cuisine: A Benchmark Dataset with Turkish Meals for Food Recognition)", *25. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2017)*, Antalya, Mayıs 2017.
9. Çağdas Bak, Aykut Erdem, Erkut Erdem, "Baskın Kümeler ile Hareket Yörüngelerinin Öbeklenmesi (Clustering Motion Trajectories via Dominant Sets)", *24. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
10. Burçak Asal, Aykut Erdem, Erkut Erdem, "İnsan Kalabalıklarının Baskın Kümeler Tabanlı Analizi (Dominant Sets Based Analysis of Human Crowds)", *24. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
11. Goksu Erdogan, Bora Celikkale, Aykut Erdem, Erkut Erdem, "Kişisel Görüntü Kümelerinin İçsel Özellikler Kullanılarak Özetlenmesi (Summarizing Personal Image Collections with Intrinsic Properties)", *24. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
12. Mesut Erhan Ünal, Begüm Çıtamak, Semih Yağcıoğlu, Aykut Erdem, Erkut Erdem, Nazlı İkizler Cinbiş, Ruket Çakıcı, "TasvirEt: Görüntülerden Otomatik Türkçe Açıklama Oluşturma İçin Bir Denektaşı Veri Kümesi (TasvirEt: A Benchmark Dataset for Automatic Turkish Description Generation from Images)", *24. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2016)*, Zonguldak, Mayıs 2016.
13. Mehmet Günel, Levent Karacan, Aykut Erdem, Erkut Erdem, "Sık Eşleme Yoluyla Görüntü Renklendirme (Image Colorization via Dense Correspondences)", *22. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
14. Mert Kılıçkaya, Erkut Erdem, Aykut Erdem, Nazlı İkizler Cinbiş, Ruket Çakıcı, "Meta-sınıf Tabanlı Getirme ile Veriye Dayalı İmge Altyazılama (Data-driven Image Captioning with Meta-class Based Retrieval)", *22. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
15. Okan Tarhan Tursun, Ahmet Oguz Akyuz, Aykut Erdem, Erkut Erdem, "YDA Görüntüler İçin Gölgeleme Giderme Algoritmalarının Karşılaştırılması (Evaluating Deghosting Algorithms for HDR Images)", *22. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
16. Kübra Mammadova, Erkut Erdem, Aykut Erdem, "Görsel Belirginlik Güdümlü Pozlandırma Birleştirimi (Visual Saliency Guided Exposure Fusion)", *22. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2014)*, Trabzon, Nisan 2014.
17. Hasan Tuğrul Erdoğan, Erkut Erdem, Aykut Erdem, "Alan Kovaryansları İçin Grup Seyrekliğine Dayalı Seyrek Kodlama (Group Sparsity Based Sparse Coding for Region Covariances)", *21. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2013)*, Girne, KKTC, Nisan 2013.
18. Osman Akın, Aykut Erdem, Erkut Erdem, "MILIS Çoklu Örnekle Öğrenme Algoritmasının Farklı Bir Örnek Seçme Yöntemiyle Yeniden İncelenmesi (Revisiting MILIS Multiple Instance Learning Algorithm with A Different Instance Selection Mechanism)", *20. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2012)*, Ölüdeniz, Fethiye, Muğla, Nisan 2012.

19. M. Erkut Erdem, I. Aykut Erdem, U. Yılmaz, V. Atalay, "Üç Boyutlu Katı Nesnelerin Yansıtma Özelliklerinin Görüntülerden Çıkarılması", *12. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2004)*, pp. 245-248, Kuşadası, Nisan 2004.
20. İ. Aykut Erdem, M. Erkut Erdem, Volkan Atalayi A. Enis Cetin, "Engelliler İçin Bilgisayarlı Görmeye Dayalı Klavye ve Fare Sistemi", *11. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2003)*, pp. 196-199, İstanbul, Haziran 2003.
21. İ. Aykut Erdem, M. Erkut Erdem, Volkan Atalay, A. Enis Cetin, "Kağıt Klavye: Bilgisayarlı Görmeye Dayalı Klavye", *10. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2002)*, Pamukkale, Haziran 2002.
22. İ. Aykut Erdem, M. Erkut Erdem, Volkan Atalay, A. Enis Cetin, "Bilgisayarlı Görmeye Dayalı Fare Sistemi", *10. IEEE Sinyal İşleme ve İletişim Uygulamaları Kurultayı (SİU 2002)*, Pamukkale, Haziran 2002.

Conference Presentations (Abstract only)

1. Halit Ozsoy, Mert Cokelek, Inci Ayhan, Erkut Erdem, Aykut Erdem, "How scene attributes and sound influence visual exploration of omnidirectional panoramic scenes", *Annual Meeting of the Cognitive Science Society (CogSci)*, Toronto, Canada, July 2022.
2. Mert Kilickaya, Aykut Erdem, Nazli Ikizler-Cinbis, and Erkut Erdem, "Re-evaluating Automatic Metrics for Image Captioning", *ICCV17 Second Workshop on Closing the Loop Between Vision and Language (CLVL)*, Venice, Italy, October 2017.
3. Cagdas Bak, Aysun Kocak, Aykut Erdem and Erkut Erdem, "Spatio-Temporal Saliency Networks for Dynamic Saliency Prediction", *ICCV International Workshop on 'Mutual Benefits of Cognitive and Computer Vision (MBCC)*, Venice, Italy, October 2017.
4. Sibel Tari, Cagri Aslan, Emre Baseski and Aykut Erdem, "Shape Scale: Representing Shapes at Their Absolute Scales", *SIAM Annual Meeting 2006*, Boston, USA, July 2006.
5. M. Iskar, Erku Erdem, A. Erdem, S. Akman, A. Dickerman, V. Atalay and R. Cetin-Atalay, "CAPRIS: A Database for Cancer Gene Promoter Related Motif Search", *FEBS Journal*, Vol. 273, pp. 248, June 2006.
6. Erkut Erdem, Aykut Erdem and Volkan Atalay, "Image-based Extraction of Material Reflectance Properties of a 3D Rigid Object", *Eurographics 2003*, Poster Session, Granada, Spain, September 2003.
7. Aykut Erdem, Erkut Erdem, Volkan Atalay and A. Enis Cetin, "Computer based text entry for Wearable Computing", *6th IEEE International Symposium on Wearable Computers (ISWC 2002)*, Demonstrations, Seattle, USA, October 2002.
8. Aykut Erdem, Erkut Erdem, Yasemin Yardimci, Volkan Atalay and A. Enis Cetin, "Computer Vision Based Mouse", *IEEE International Conference on Acoustics, Speech, and Signal Processing 2002 (ICASSP 2002)*, Student Forum Session, Florida, USA, May 2002.

Technical Reports

1. Aykut Erdem and Andrea Torsello, "A Game Theoretic Approach To Jointly Learn Shape Categories and Contextual Similarities", Dipartimento di Informatica, Universitá Ca' Foscari di Venezia, CS-2009-8, July 2009.
2. Aykut Erdem, "A dynamic procedure for forming shape categories from skeletal shape trees", Department of Computer Engineering, Middle East Technical University, METU-CENG-TR-2007-04, July 2007.

Theses

- Aykut Erdem, "Category Knowledge, Skeleton Based Shape Matching and Shape Classification", *PhD Thesis*, Middle East Technical University, Turkey, October 2008.
- Aykut Erdem, "Vision-Based Human-Computer Interaction Using Laser Pointer", *MSc Thesis*, Middle East Technical University, Turkey, July 2003.

Theses Supervised

PhD Theses Supervised

1. Ismail Bora Celikkale, "Generating Stories from Large Scale Image Collections", *PhD Thesis*, Hacettepe University, February 2020.
2. Yasin Kavak, "Learning Visual Saliency for Static and Dynamic Scenes, *PhD Thesis*, Hacettepe University, September 2017.
3. Osman Akin, "Part-Based Object Tracking with Correlation Filters, *PhD Thesis*, Hacettepe University, August 2016.

MSc Theses Supervised

1. Burcak Asal, "A Robust Method To Identify Overlapping Crowd Motion Patterns', MSc Thesis, Hacettepe University, January 2017
2. Cagdas Bak, "Deep Learning Based Saliency Prediction In Videos", *MSc Thesis*, Hacettepe University, July 2016.
3. Mert Kilickaya (supervised with Nazli Ikizler Cinbis), "Visual Importance: Modeling With Applications To Vision And Language", *MSc Thesis*, Hacettepe University, July 2016.
4. Hasan Tugrul Erdogan (co-supervised with Erkut Erdem), "Sparsity-based Discriminative Tracking With Adaptive Cue Integration", *MSc Thesis*, Hacettepe University, August 2015.
5. Levent Karacan (co-supervised with Erkut Erdem), "Image Smoothing By Using First And Second Order Region Statistics", *MSc Thesis*, Hacettepe University, January 2014.

Research Grants

As Principal Investigator

- Quality Assessment of 360° Videos Guided by Audio-Visual Saliency
  The goal of the project is to investigate automatic evaluation metrics for assessing the quality of the 360° videos experienced through VR devices. Our aim is to contribute to this emerging field of research by exploring the use of human visual attention and multimodal computational saliency models that can process visual and auditory cues. In this way, the proposed model will make predictions more aligned with human perception. More specifically, we will first develop novel deep

  Project Duration: 3 years (15/03/2021-15/03/2024)

  The Scientific and Technological Research Council of Turkey (TUBITAK) The Support Program for Scientific and Technological Research Projects (Award# 120E501)

neural network architecture for predicting saliency in 360° panoramic videos with ambisonic spatial audio. To train and evaluate our models, we will collect a large video corpus that includes eye fixation data for 360° videos containing 360° spatial audio. This will be yet another contribution to the literature since no such dataset exists and it will facilitate further research on this topic. Secondly, we will collect a new video dataset and develop novel techniques for quality assessment of VR content captured in real environments, which will explicitly exploit the estimated audio-visual saliency maps of the input 360° video.

- Summarization Approaches Towards Interpreting Big Visual Data

  Project Duration: 3 years (15/09/2017-15/09/2020)

  The Scientific and Technological Research Council of Turkey (TUBITAK) Primary Subjects R&D Funding Program (Award# 116E685)

  The aim of the proposed project is to interpret big and noisy visual data, which has been recorded in diversified environments with no predefined constraints. To this end, the goal is to develop and apply original data mining methods towards extracting important knowledge and increase the accessibility of such archives. Particularly, we aim to focus on summarization approaches, so that the big visual data is more effectively structured and enriched with additional semantic information. The summarization approaches that make use of the multi-modal nature of the data will focus on three main problems: 1) To learn semantic concepts and spatio-temporal attributes from big visual data; 2) organization of large photograph collections; 3) summarization of videos in large web archives. In all these problems, big visual data and the additional information referred as metadata will be handled together.

- Towards A Unified Framework For Finding What Is Interesting In Videos

  Project Duration: 3 years (01/04/2014-01/04/2017)

  The Scientific and Technological Research Council of Turkey (TUBITAK) Career Development Program (Award# 113E497)

  The goal of this project is to develop and apply effective computer vision techniques that can automatically detect "what is interesting" in such videos. Here, what is meant by interesting may refer to different notions such as where people look in videos, salient objects, interesting motion patterns or moments in videos. All these topics listed above form the subject matter of the proposed project. It is important to note that each notion of interestingness involves different computational problems that need to be solved. This project, unlike the previous work, will investigate all these interrelated concepts within a unified framework and this will allow us to detect different levels of interestingness in a more accurate way.Although the aforementioned problems are closely related to each other, most of the existing literature treats them separately – as mentioned above. In this project, we bridge this gap by developing various techniques and methodologies for solving each task, which take advantage of simultaneously using additional information from other sources of interestingness.

As Co-Investigator

- Seeing Through Events: End-to-End Approaches to Event-Based Vision Under Extremely Low-Light Conditions

  Project Duration: 3 years (15/03/2022-15/03/2025)

  The Scientific and Technological Research Council of Turkey (TUBITAK) The Support Program for Scientific and Technological Research Projects (Award# 121E454)

  The aim of the proposed project is to provide novel ways to process event data using deep neural networks and will offer hybrid approaches to bring traditional

cameras and event cameras together to solve crucial challenges we face when capturing and processing videos in dark. The neural architectures that will be explored in this research project can also be applied to other event- based computer vision tasks.

- Using Synthetic Data for Deep Person Re-Identification
  The aim of the proposed project is to produce new large-scale datasets which will allow construction of more powerful deep models for person re-identification and are much larger and more comprehensive than the existing ones. For this purpose, instead of manually labeling images taken from cameras placed at different locations under specific scenarios, in our project, we will investigate novel synthetic data generation methods.

  Project Duration: 2 years (01/06/2018-01/06/2020)

  The Scientific and Technological Research Council of Turkey (TUBITAK) The Support Program for Scientific and Technological Research Projects (Award# 217E029)

- A Multimodal and Multilingual Framework for Video Captioning
  In this project, we claim that novel automatic description generation approaches should be developed for low-resource, highly inflected and highly agglutinative languages to further boost research on integrated vision and language. We aim to contribute to this area of research by exploring video captioning approaches, with a special focus on the Turkish language. With this objective, first, we will develop novel video captioning approaches, which can deal with language-specific properties of Turkish. Secondly, we will study cross-lingual video captioning where the models exploit descriptions in English as an additional source of information during the caption generation process.

  Project Duration: 2 years (01/06/2018-01/06/2020)

  The Scientific and Technological Research Council of Turkey (TUBITAK) and British Council - Newton-Katip Çelebi Fund Institutional Links Grant Programme (Award# 217E054)

- Understanding Images and Visualizing Text: Semantic Inference and Retrieval by Integrating Computer Vision and Natural Language Processing
  This project will explore the connection between vision and language from different directions in which we will integrate computer vision and natural language processing methods. By using these two fields together, automatic systems that transcribe the visual content of images with vivid descriptions which are very alike to human language will be obtained. Similarly, in the context of this project, retrieval systems that describe the sentence or paragraph-based textual queries visually via related images or image sets will be constructed.

  Project Duration: 3 years (01/10/2013-01/10/2016)

  The Scientific and Technological Research Council of Turkey (TUBITAK) The Support Program for Scientific and Technological Research Projects (Award# 113E116) and European Union under European Cooperation in Science and Technology (COST) Programme (ICT COST IC1037 Action)

- The Use of Multiple Cues and Contextual Knowledge in Computer Vision
  This project will explore the influences of visual context and multiple cues on a number of computer vision problems. First, a novel visual saliency or attention model will be developed towards a direction that combines information coming from multiple cues with the contextual knowledge. The goal is to come up with a model that can effectively predict where people look in an image. In the second part of the project, we will investigate the problem of image filtering with a focus on devising appropriate ways of extracting high-level contextual knowledge for filtering and using them to guide the ongoing image smoothing process. The third part of the project will be about developing adaptive approaches to image

  Project Duration: 3 years (01/10/2012-01/10/2015)

  The Scientific and Technological Research Council of Turkey (TUBITAK) Career Development Program (Award# 112E146)

segmentation that integrates information obtained from multi cues. A novel and effective segmentation algorithm will be developed that adaptively combines high-level prior knowledge with the information obtained from different visual cues at different scales.

As Consultant

- Design and Experimental Demonstration of Phase Balanced Optical Power Splitters for Next-Generation Nanophotonic Technologies Through Machine Learning
  The aim of the proposed project is to develop a new photonic simulation method that is at least 100 times faster than 3D simulations but with matching physical accuracy. This method will be realized using a data driven deep learning model, and will create a paradigm shift in nanophotonics and electromagnetic design.

Project Duration: 3 years (31/03/2022-31/03/2025)

The Scientific and Technological Research Council of Turkey (TUBITAK) The Support Program for Scientific and Technological Research Projects (Award# 122E214)

Professional Activities

Reviewer for Journals

- Elsevier Computers & Graphics
- Elsevier Computer Vision and Image Understanding
- Elsevier Pattern Recognition
- IEEE Computer Graphics and Applications
- IEEE Robotics and Automation Letters
- IEEE Transactions on Image Processing
- IEEE Transactions on Multimedia
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IET Computer Vision
- International Journal of Pattern Recognition and Artificial Intelligence Pattern Recognition
- Signal Processing: Image Communication

Program Committee

- 6th Workshop on Vision and Language (VL'17)
- 5th Workshop on Vision and Language (VL'16)
- 3rd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD 2015)
- 2nd International Workshop on Similarity-Based Pattern Analysis and Recognition (SIMBAD 2013)

Reviewer for Conferences

- Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL-HLT), 2021
- Annual Meeting of the Association for Computational Linguistics (ACL) 2019, 2020, 2021
- Asian Conference on Computer Vision (ACCV), 2016
- Asian Conference on Machine Learning (ACML), 2020, 2022
- British Machine Vision Conference (BMVC), 2018, 2017, 2022
- Conference on Empirical Methods in Natural Language Processing (EMNLP) 2019, 2020, 2021, 2022
- Conference of the European Chapter of the Association for Computational Linguistics (EACL) 2021
- European Conference on Computer Vision (ECCV), 2018, 2016
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2018, 2017, 2016, 2015, 2014
- IEEE International Conference on Computer Vision (ICCV), 2017, 2015, 2009
- IEEE International Conference on Robotics and Automation (ICRA), 2020, 2017, 2013
- IEEE Winter Conference on Applications of Computer Vision (WACV) 2016, 2015, 2014, 2013
- International Conference on Pattern Recognition (ICPR), 2016, 2010
- SIGGRAPH Asia, 2018, 2022
- SIGNLL Conference on Computational Natural Language Learning (CoNLL), 2019, 2020

Memberships

- 2015 – present The Association for Computational Linguistics
- 2013 – present The Computer Vision Foundation
- 2022 – present IEEE Signal Processing Society